JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

COURSE STRUCTURE AND SYLLABUS

For UG – R20

B. TECH - ELECTRONICS AND COMMUNICATION TECHNOLOGY

(Applicable for batches admitted from 2020-2021)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

COURSE STRUCTURE

I Year – I SEMESTER

S. No	Course Code	Subjects	L	T	P	Credits
1		Communicative English	3	0	0	3
2		Mathematics -I	3	0	0	3
3		Applied Chemistry	3	0	0	3
4		Programming for Problem Solving Using C	3	0	0	3
5		Engineering Graphics	1	0	4	3
6		English Communication Skills Lab	0	0	3	1.5
7		Applied Chemistry Lab	0	0	3	1.5
8		Programming for Problem Solving Using C Lab	0	0	3	1.5
Total Credits						**19.5**

I Year – II SEMESTER

S. No	Course Code	Subjects	L	T	P	Credits
1		Mathematics –II	3	0	0	3
2		Applied Physics	3	0	0	3
3		Object Oriented Programming through Java	2	0	2	3
4		Network Analysis	3	0	0	3
5		Basic Electrical Engineering	3	0	0	3
6		Electronic workshop Lab	0	0	3	1.5
7		Basic Electrical Engineering Lab	0	0	3	1.5
8		Applied Physics Lab	0	0	3	1.5
9		Environmental Science	3	0	0	0.0
Total Credits						**19.5**

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I Year - I Semester		L	T	P	C
		3	0	0	3
COMMUNICATIVE ENGLISH					

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Learning Outcomes

At the end of the module, the learners will be able to

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

Unit 1:

Lesson-1: A Drawer full of happiness from "**Infotech English**", Maruthi Publications

Lesson-2: Deliverance by Premchand from "**The Individual Society",**Pearson Publications. (Non-detailed)

Listening: Listening to short audio texts and identifying the topic. Listening to prose, prose and conversation.

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Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introductions and introducing others.
Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.
Reading for Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters.
Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) (Antonyms and Synonyms, Word applications) Verbal reasoning and sequencing of words.
Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural basic sentence structures; simple question form - wh-questions; word order in sentences.
Pronunciation: Vowels, Consonants, Plural markers and their realizations

Unit 2:

Lesson-1: Nehru's letter to his daughter Indira on her birthday from "**Infotech English**", Maruthi Publications

Lesson-2: Bosom Friend by Hira Bansode from "**The Individual Society",** Pearson Publications.(Non-detailed)

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks. Functional English: Greetings and leave takings.**Reading**: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) (Antonyms and Synonyms, Word applications)

Grammar: Use of articles and zero article; prepositions.

Pronunciation: Past tense markers, word stress-di-syllabic words

Unit 3:

Lesson-1: Stephen Hawking-Positivity 'Benchmark' from "**Infotech English**", Maruthi Publications

Lesson-2: Shakespeare's Sister by Virginia Woolf from "**The Individual Society",** Pearson Publications.(Non-detailed**)**

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.Functional English:Complaining and Apologizing.
Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension.Critical reading.

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Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. Letter writing-types, format and principles of letter writing.E-mail etiquette, Writing CV's.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Association, sequencing of words

Grammar: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Pronunciation: word stress-poly-syllabic words.

Unit 4:

Lesson-1: Liking a Tree, Unbowed: Wangari Maathai-biography from "**Infotech English**", Maruthi Publications

Lesson-2: Telephone Conversation-Wole Soyinka from "**The Individual Society",** Pearson Publications**.**(Non-detailed)

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio); listening to audio-visual texts.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.Functional English: Permissions, Requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.
Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.Writing SOP, writing for media.
Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Cloze Encounters.
Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Pronunciation: Contrastive Stress

Unit 5:

Lesson-1: Stay Hungry-Stay foolish from "**Infotech English**", Maruthi Publications

Lesson-2: Still I Rise by Maya Angelou from "**The Individual Society",** Pearson Publications.(Non-detailed)

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides.Functional English: Suggesting/Opinion giving.
Reading: Reading for comprehension. RAP StrategyIntensive reading and Extensive reading techniques.
Reading for Writing: Writing academic proposals- writing research articles: format and style.

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Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Coherence, matching emotions.

Grammar: Editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Pronunciation: Stress in compound words

Prescribed text books for theory for Semester-I:

1. "**Infotech English**", Maruthi Publications. (Detailed)

2."**The Individual Society",** Pearson Publications.(Non-detailed)

Prescribed text book for Laboratory for Semesters-I & II:

1. "**Infotech English**", Maruthi Publications. (with Compact Disc)

Reference Books:

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.

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I Year - I Semester		L	T	P	C
		3	0	0	3
MATHEMATICS-I					

Course Objectives:

- This course will illuminate the students in the concepts of calculus.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes:

At the end of the course, the student will be able to

- Utilize mean value theorems to real life problems (L3)
- Solve the differential equations related to various engineering fields (L3)
- Familiarize with functions of several variables which is useful in optimization (L3)
- Apply double integration techniques in evaluating areas bounded by region (L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems (L5)

UNIT I: Sequences, Series and Mean value theorems: (10 hrs)

Sequences and Series: Convergences and divergence – Ratio test – Comparison tests – Integral test – Cauchy's root test – Alternate series – Leibnitz's rule.

Mean Value Theorems (without proofs): Rolle's Theorem – Lagrange's mean value theorem – Cauchy's mean value theorem – Taylor's and Maclaurin's theorems with remainders.

UNIT II: Differential equations of first order and first degree: (10 hrs)

Linear differential equations – Bernoulli's equations – Exact equations and equations reducible to exact form.

Applications: Newton's Law of cooling – Law of natural growth and decay – Orthogonal trajectories – Electrical circuits.

UNIT III: Linear differential equations of higher order: (10 hrs)

Non-homogeneous equations of higher order with constant coefficients – with non-homogeneous term of the type e^{ax}, sin ax, cos ax, polynomials in x^n, $e^{ax}V(x)$ and $x^nV(x)$ – Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

UNIT IV: Partial differentiation: (10 hrs)

Introduction – Homogeneous function – Euler's theorem – Total derivative – Chain rule – Jacobian – Functional dependence – Taylor's and Mc Laurent's series expansion of functions of two variables.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

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UNIT V: Multiple integrals: (8 hrs)
Double and Triple integrals – Change of order of integration – Change of variables.
Applications: Finding Areas and Volumes.

Text Books:

1) B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2) B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1) Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2) Joel Hass, Christopher Heil and Maurice D. Weir, Thomas calculus, 14th Edition, Pearson.
3) Lawrence Turyn, Advanced Engineering Mathematics, CRC Press, 2013.
4) Srimantha Pal, S C Bhunia, Engineering Mathematics, Oxford University Press.

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I Year - I Semester		L	T	P	C
		3	0	0	3
APPLIED CHEMISTRY					

Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources.

COURSE OBJECTIVES

- ***Importance*** of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- ***Outline*** the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- ***Explain*** the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- ***Recall*** the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- ***Outline*** the basics of computational chemistry and molecular switches

UNIT I: POLYMER TECHNOLOGY 8 hrs

Polymerisation:-Introduction, methods of polymerization (emulsion and suspension), mechanical properties.

Plastics: Compounding, fabrication (compression, injection, blown film and extrusion), preparation, properties and applications (PVC, polycarbonates and Bakelite), mention some examples of plastic materials used in electronic gadgets, recycling of e-plastic waste (waste to wealth).

Elastomers:- Introduction, preparation, properties and applications (Buna S, thiokol and polyurethanes).

Composite materials: Fiber reinforced plastics, conducting polymers, biodegradable polymers, biopolymers, biomedical polymers.

Course Outcomes: ***At the end of this unit, the students will be able to***

- ***Analyze*** the different types of composite plastic materials and ***interpret***the mechanism of conduction in conducting polymers.

UNIT II: ELECTROCHEMICAL CELLS AND CORROSION 10hrs

Single electrode potential, electrochemical series and uses of series, standard hydrogen electrode, calomel electrode, construction of glass electrode, batteries (Dry cell, Li ion battery and zinc air cells), fuel cells (H_2-O_2, CH_3OH-O_2, phosphoric acid and molten carbonate).

Corrosion:-Definition, theories of corrosion (chemical and electrochemical), galvanic corrosion, differential aeration corrosion, stress corrosion, galvanic series, factors influencing rate of corrosion, corrosion control (proper designing and cathodic protection), Protective coatings (surface preparation, cathodic coatings, anodic coatings, electroplating and electroless plating [nickel]), Paints (constituents, functions and special paints).

Course Outcomes: ***At the end of this unit, the students will be able to***

- ***Utilize*** the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and c***ategorize*** the reasons for corrosion and study methods to control corrosion.

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UNIT III: MATERIAL CHEMISTRY **10 hrs**

Part I: ***Non-elementalsemiconducting materials****:-* Stoichiometric, controlled valency & chalcogen photo/semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling, epitaxy, diffusion, ion implantation) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).

Insulators &magnetic materials: electrical insulators-ferro and ferri magnetism-Hall effect and its applications.

Part II:

Nano materials:- Introduction, sol-gel method, characterization by (Brunauer Emmet Teller [BET]), (scanning electron microscopy [SEM]) and (transmission electron microscopy [TEM]), applications of graphene and fullerenes, carbon nanotubes (types, preparation and applications)

Liquid crystals:- Introduction-types-applications.

Super conductors:-Type –I, Type II-characteristics and applications

Course Outcomes: ***At the end of this unit, the students will be able to***

- ***Synthesize*** nanomaterials for modern advances of engineering technology.
- ***Summarize the*** preparation of semiconductors; analyze the applications of liquid crystals and superconductors.

UNIT IV: SPECTROSCOPIC TECHNIQUES &NON-CONVENTIONAL ENERGY SOURCES 10hrs

Part A: **SPECTROSCOPIC TECHNIQUES**

Electromagnetic spectrum-UV (laws of absorption, instrumentation, theory of electronic spectroscopy, Frank-condon principle, chromophores and auxochromes, intensity shifts, applications), FT-IR [instrumentation and differentiation of sp, sp^2, sp^3 and IR stretching of functional groups (alcohols, carbonyls, amines) applications], magnetic resonance imaging and CT scan (procedure & applications).

Part B*:* NON-CONVENTIONAL ENERGY SOURCES

Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion.

Course Outcomes: ***At the end of this unit, the students will be able to***

- ***Analyze*** the principles of different analytical instruments and their applications.
- ***Design***models for energy by different natural sources.

UNIT V: ADVANCED CONCEPTS/TOPICS IN CHEMISTRY8hrs

Computational chemistry: Introduction to computational chemistry, molecular modelling and docking studies

Molecular switches**:** characteristics of molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid-base controlled molecular shuttle, a molecular elevator, an autonomous light-powered molecular motor

Course Outcomes: ***At the end of this unit, the students will be able to***

- ***Obtain*** the knowledge of computational chemistry and molecular machines

Standard Books:

1. P.C. Jain and M. Jain "**Engineering Chemistry**", 15/e, Dhanpat Rai & Sons, Delhi, (Latest edition).
2. Shikha Agarwal, "**Engineering Chemistry**", Cambridge University Press, New Delhi, (2019).
3. S.S. Dara, "**A Textbook of Engineering Chemistry**", S.Chand& Co, (2010).
4. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai Publicating Co.(Latest edition).

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Reference:

1. K. SeshaMaheshwaramma and MridulaChugh, "**Engineering Chemistry**", Pearson India Edn.
2. O.G. Palana, "**Engineering Chemistry**", Tata McGraw Hill Education Private Limited, (2009).
3. CNR Rao and JM Honig (Eds) "**Preparation and characterization of materials**" Academic press, New York (latest edition)
4. B. S. Murthy, P. Shankar and others, "**Textbook of Nanoscience and Nanotechnology**", University press (latest edition)

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I Year - I Semester		L	T	P	C
		3	0	0	3
PROGRAMMING FOR PROBLEM SOLVING USING C					

COURSE OBJECTIVES:

The objectives of Programming for Problem Solving Using C are

- To learn about the computer systems, computing environments, developing ofacomputer program and Structure of aCProgram
- To gain knowledge of the operators, selection, control statements and repetition inC
- To learn about the design concepts of arrays, strings, enumerated structure andunion types. To learn abouttheirusage.
- To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.
- To assimilate about FileI/O and significanceoffunctions

UNIT I

Introduction to Computers: Creating and running Programs, Computer Numbering System, Storing Integers, Storing Real Numbers

Introduction to the C Language: Background, C Programs, Identifiers, Types, Variable, Constants, Input/output, Programming Examples, Scope, Storage Classes and Type Qualifiers. **Structure of a C Program:** Expressions Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion Statements, Simple Programs, Command Line Arguments.

UNIT II

Bitwise Operators: Exact Size Integer Types, Logical Bitwise Operators, Shift Operators. **Selection & Making Decisions:** Logical Data and Operators, Two Way Selection, Multiway Selection, More Standard Functions

Repetition: Concept of Loop, Pretest and Post-test Loops, Initialization and Updating, Event and Counter Controlled Loops, Loops in C, Other Statements Related to Looping, Looping Applications, Programming Examples

UNIT III

Arrays: Concepts, Using Array in C,ArrayApplication, Two DimensionalArrays, Multidimensional Arrays, Programming Example – CalculateAverages

Strings: String Concepts, C String, String Input / Output Functions, Arrays of Strings, String Manipulation Functions String/ Data Conversion, A Programming Example – Morse Code **Enumerated, Structure, and Union:** The Type Definition (Type-def), Enumerated Types, Structure, Unions, and Programming Application

UNIT IV

Pointers: Introduction, Pointers to pointers, Compatibility, L value and R value

Pointer Applications: Arrays, and Pointers, Pointer Arithmetic and Arrays, Memory Allocation Function, Array of Pointers, Programming Application

Processor Commands: Processor Commands

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UNIT V

Functions: Designing, Structured Programs, Function in C, User Defined Functions, Inter- Function Communication, Standard Functions, Passing Array to Functions, Passing Pointers to Functions, Recursion

Text Input / Output: Files, Streams, Standard Library Input / Output Functions, Formatting Input / Output Functions, Character Input / Output Functions

Binary Input / Output: Text versus Binary Streams, Standard Library, Functions for Files,Converting File Type.

TEXT BOOKS:

1. Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE
2. The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie,2e,Pearson

REFERENCES:

1. Computer Fundamentals and Programming, Sumithabha Das, McGrawHill
2. Programming in C, Ashok N. Kamthane, AmitKamthane,Pearson
3. Computer Fundamentals and Programming in C, PradipDey, ManasGhosh,OXFORD

COURSE OUTCOMES:

Upon the completion of the course the student will learn

- To write algorithms and to draw flowcharts forsolvingproblems
- To convert flowcharts/algorithms to C Programs, compile anddebugprograms
- To use different operators, data types and write programs that use two-way/ multi-way selection
- To select the best loop construct for agivenproblem
- To design and implement programs to analyze the differentpointerapplications
- To decompose a problem into functions and to develop modularreusablecode
- To apply FileI/Ooperations.

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I Year - I Semester		L	T	P	C
		1	0	4	3

ENGINEERING GRAPHICS

Course Objective: Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I
Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.
Introduction to Engineering graphics.
Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.
Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces.

Unit II
Objective: The objective is to make the students draw the projections of the plane and solids inclined toboth the reference planes.
Projections of planes: Construction of polygons, regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane, plane objects/ inclined toboth the reference plane.
Projections of Solids – Prisms, Pyramids, Cones and Cylinders – simple positions.

Unit III
Objective:
The objective is to make the students draw the projections ands sections of the various types of solids in different positions inclined to both the planes.
Projections of Solids – Prisms, Pyramids, Cones and Cylinders – axis inclined to both the planes.
SECTIONS OF SOLIDS: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

UNIT-IV
Objective:
The knowledge of interpenetration of solids and development of surfaces is required in designing and manufacturing of the objects. Whenever two or more solids combine, a definite curve is seen at their intersection.
INTERPENETRATION OF RIGHT REGULAR SOLIDS: Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Prism Vs Cone.
DEVELOPMENT OF SURFACES: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone and their parts.

Unit V
Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

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TEXT BOOKS:

1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

Course Outcomes:

CO1. To make the students to draw the attributes and its importance in the fields of design and manufacturing
CO2. To make the student familiar with the techniques used for drawing various geometric elements used in engineering practice.
CO3. Making them to understand orthographic projections of points, lines, planes and solids in various positions with respect to different reference planes.
CO4. Ability to use the concepts of isometric projections to analyze 3D objects by viewing their 2D projections and vice versa.

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I Year - I Semester		L	T	P	C
		0	0	3	1.5
ENGLISH COMMUNICATION SKILLS LAB					

TOPICS

UNIT I:
Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation,

UNIT II:
Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)

UNIT III:
Stress in compound words,rhythm, intonation,accent neutralisation.

UNIT IV:
Listening to short audio texts and identifying the context and specific pieces of information toanswer a series of questions in speaking.

UNIT V:
Newspapers reading;Understanding and identifying key terms and structures useful for writing reports.

Prescribed text book: "**Infotech English**", Maruthi Publications.

References:
1. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
2. English Pronunciation in use- Mark Hancock, Cambridge University Press.
3. English Phonetics and Phonology-Peter Roach, Cambridge University Press.
4. English Pronunciation in use- Mark Hewings, Cambridge University Press.
5. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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I Year - I Semester		L	T	P	C
		0	0	3	1.5
APPLIED CHEMISTRY LAB					

Introduction to Chemistry laboratory – Molarity, normality, primary, secondary standard solutions, volumetric titrations, quantitative analysis

1. Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of Mn^{+2} using standard oxalic acid solution.
4. Determination of ferrous iron using standard $K_2Cr_2O_7$ solution.
5. Determination of Cu^{+2} using standard hypo solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Fe^{+3} by a colorimetric method.
8. Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).
9. Determination of iso-electric point of amino acids using pH-metry method/conductometric method.
10. Determination of the concentration of strong acid vs strong base (by conductometric method).
11. Determination of strong acid vs strong base (by potentiometric method).
12. Determination of Mg^{+2} presentin an antacid.
13. Determination of $CaCO_3$ present in an egg shell.
14. Estimation of Vitamin C.
15. Determination of phosphoric content in soft drinks.
16. Adsorption of acetic acid by charcoal.
17. Preparation of nylon-6, 6 and Bakelite (demonstration only).

Of the above experiments at-least 10 assessment experiments should be completed in a semester.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

Reference Books

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

I Year - I Semester		L	T	P	C
		0	0	3	1.5
PROGRAMMING FOR PROBLEM SOLVING USING C LAB					

Course Objectives:

1) Apply the principles of C language inproblemsolving.
2) To design flowcharts, algorithms and knowing how todebugprograms.
3) To design & develop of C programs using arrays, strings pointers&functions.
4) To review the file operations, preprocessor commands.

Exercise 1:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five andfourcharacters.
2. Write a C program to compute the perimeter and area of a rectangle with a heightof7 inches and width of5inches.
3. Write a C program to displaymultiplevariables.

Exercise 2:

1. Write a C program to calculate the distance between thetwopoints.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrongvalues".

Exercise 3:

1. Write a C program to convert a string to alonginteger.
2. Write a program in C which is a Menu-Driven Program to compute the area of the variousgeometricalshape.
3. Write a C program to calculate the factorial of agivennumber.

Exercise 4:

1. Write a program in C to display the n terms of even natural number andtheirsum.
2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ...1/nterms.
3. Write a C program to check whether a given number is an Armstrong numberornot.

Exercise 5:

1. Write a program in C to print all unique elements inanarray.
2. Write a program in C to separate odd and even integers inseparatearrays.
3. Write a program in C to sort elements of array inascendingorder.

Exercise 6:

1. Write a program in C for multiplication of two squareMatrices.
2. Write a program in C to find transpose of agivenmatrix.

Exercise 7:

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string inreverseorder.

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Exercise 8:

1. Write a program in C to compare two strings without using string libraryfunctions.
2. Write a program in C to copy one string toanotherstring.

Exercise 9:

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers intheprogram.

Exercise 10:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address)operator.
2. rite a program in C to add two numbersusingpointers.

Exercise 11:

1. Write a program in C to add numbers using callbyreference.
2. Write a program in C to find the largest element using DynamicMemoryAllocation.

Exercise 12:

1. Write a program in C to swap elements using callbyreference.
2. Write a program in C to count the number of vowels and consonants in a string using apointer.

Exercise 13:

1. Write a program in C to show how a functionreturningpointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc()function.

Exercise 14:

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc( ) function. Understand the difference between the abovetwoprograms
2. Write a program in C to convert decimal number to binary number usingthefunction.

Exercise 15:

1. Write a program in C to check whether a number is a prime number or not using the function.
2. Write a program in C to get the largest element of an array usingthefunction.

Exercise 16:

1. Write a program in C to append multiple lines at the end of atextfile.
2. Write a program in C to copy a file inanothername.
3. Write a program in C to remove a file fromthedisk.

Course Outcomes:

By the end of the Lab, the student

1) Gains Knowledge on various concepts of aClanguage.
2) Able to draw flowcharts andwritealgorithms.
3) Able design and development of C problemsolvingskills.
4) Able to design and develop modularprogrammingskills.
5) Able to trace and debugaprogram

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

I Year - II Semester		L	T	P	C
		3	0	0	3
MATHEMATICS-II					

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes: At the end of the course, the student will be able to

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- apply numerical integral techniques to different Engineering problems (L3)
- apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

UNIT – I: Solving systems of linear equations, Eigen values and Eigen vectors: (10hrs)
Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non-homogeneous linear equations – Gauss Eliminationmethod– Eigen values and Eigen vectors and properties (article-2.14 in text book-1).

Unit – II: Cayley–Hamilton theorem and Quadratic forms: (10hrs)
Cayley-Hamilton theorem (without proof) – Applications – Finding the inverse and power of a matrix by Cayley-Hamilton theorem – Reduction to Diagonal form – Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation. Singular values of a matrix, singular value decomposition (text book-3).

UNIT – III: Iterative methods: (8 hrs)
Introduction– Bisection method–Secant method – Method of false position– Iteration method – Newton-Raphson method (One variable and simultaneous Equations) – Jacobi and Gauss-Seidel methods for solving system of equations numerically.

UNIT – IV: Interpolation: (10 hrs)
Introduction– Errors in polynomial interpolation – Finite differences– Forward differences– Backward differences –Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula– Newton's divide difference formula.

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UNIT – V: Numerical differentiation and integration, Solution of ordinary differential equations with initial conditions: (10 hrs)

Numerical differentiation using interpolating polynomial – Trapezoidal rule– Simpson's $1/3^{rd}$ and $3/8^{th}$ rule– Solution of initial value problems by Taylor's series– Picard's method of successive approximations– Euler's method – Runge-Kutta method (second and fourth order).

Text Books:

1. **B. S. Grewal,** Higher Engineering Mathematics, 44^{th} Edition, Khanna Publishers.
2. **B. V. Ramana,**Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.
3. **David Poole,** Linear Algebra- A modern introduction, 4^{th} Edition, Cengage.

Reference Books:

1. **Steven C. Chapra,** Applied Numerical Methods with MATLAB for Engineering and Science,Tata Mc. Graw Hill Education.
2. **M. K. Jain, S.R.K. Iyengar and R.K. Jain,** Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
3. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

I Year - II Semester		L	T	P	C
		3	0	0	3
APPLIED PHYSICS					

Unit-I: WaveOptics **12hrs**

Interference: Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffraction - Fraunhofer diffraction due to single slit, double slit - N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating(Qualitative).

Polarization: Introduction-Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

Unit Outcomes:

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference(L2)
- **Identify** engineering applications of interference(L3)
- **Analyze** the differences between interference and diffraction with applications(L4)
- **Illustrate** the concept of polarization of light and its applications(L2)
- **Classify** ordinary polarized light and extraordinary polarized light(L2)

Unit-II: Lasers andFiberoptics ***8hrs***

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients – Population inversion – Lasing action - Pumping mechanisms – Ruby laser – He-Ne laser - Applications of lasers.

Fiber optics: Introduction –Principle of optical fiber- Acceptance Angle - Numerical Aperture - Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers - Applications.

Unit Outcomes:

The students will be able to

- **Understand** the basic concepts of LASER light Sources(L2)
- **Apply** the concepts to learn the types of lasers(L3)
- **Identifies** the Engineering applications of lasers(L2)
- **Explain** the working principle of optical fibers(L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation(L2)
- **Identify** the applications of optical fibers in various fields(L2)

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Unit III: Quantum Mechanics, Free Electron Theory andBand theory 10hrs

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory– Equation for electrical conductivity based on quantum free electron theory- Fermi-Dirac distribution- Density of states (3D) - Fermi energy.

Band theory of Solids: Bloch's Theorem (Qualitative) - Kronig - Penney model (Qualitative)- E vs K diagram - v vs K diagram - effective mass of electron – Classification of crystalline solids–concept of hole.

Unit Outcomes:

The students will be able to

- **Explain** the concept of dual nature of matter(L2)
- **Understand** the significance of wave function(L2)
- **Interpret** the concepts of classical and quantum free electron theories(L2)
- **Explain** the importance of K-Pmodel
- **Classify** the materials based on band theory(L2)
- **Apply** the concept of effective mass of electron(L3)

Unit-IV: Dielectric andMagneticMaterials 8hrs

DielectricMaterials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility and Dielectric constant - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field- Clausius- Mossotti equation-Piezoelectricity.

Magnetic Materials: Introduction - Magnetic dipole moment -Magnetization- Magnetic susceptibility and permeability - Origin of permanent magnetic moment - Classificationof
magnetic materials: Dia, para, Ferro, antiferro&Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials- Eddy currents- Engineering applications.

Unit Outcomes:

The students will be able to

- **Explain** the concept of dielectric constant and polarization in dielectric materials(L2)
- **Summarize** various types of polarization of dielectrics(L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation indielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
- **Explain** the applications of dielectric and magnetic materials(L2)
- **Apply** the concept of magnetism to magnetic data storage devices(L3)

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Unit – V: SemiconductorsandSuperconductors ***10hrs***

Semiconductors: Introduction- Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – extrinsic semiconductors – density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation- Hall effect – Hall coefficient –Applications of Hall effect.
Superconductors: Introduction – Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory (Qualitative) – Josephson effects (AC and DC) – SQUIDs – High T_c superconductors – Applications ofsuperconductors.

Unit Outcomes:

The students will be able to

- **Classify** the energy bands of semiconductors(L2)
- **Interpret** the direct and indirect band gap semiconductors(L2)
- **Identify** the type of semiconductor using Hall effect(L2)
- **Identify** applications of semiconductors in electronic devices(L2)
- **Classify** superconductors based on Meissner's effect(L2)
- **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors(L2)

Text books:

1. M. N. Avadhanulu, P.G.Kshirsagar& TVS Arun Murthy" A Text book ofEngineering Physics"-S.Chand Publications, 11thEdition2019.
2. Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press(2015).
3. Applied Physics by P.K.Palanisamy SciTechpublications.

Reference Books:

1. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley&Sons
2. Engineering Physics by M.R.Srinivasan, New Age international publishers(2009).
3. Shatendra Sharma, Jyotsna Sharma, " Engineering Physics", Pearson Education,2018
4. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, UniversityPress
5. Semiconductor physics and devices- Basic principle – Donald A, Neamen, Mc GrawHill
6. B.K. Pandey and S. Chaturvedi, Engineering Physics, CengageLearning

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

I Year - II Semester		L	T	P	C
		2	0	2	3
OBJECT ORIENTED PROGRAMMING THROUGH JAVA					

Course Objectives:

This subject will help to improve

- the analytical skills of object orientedprogramming
- Overall development of problem solving and criticalanalysis.
- Formal introduction to Java programminglanguage

Course Outcomes:

On successful completion of this course, the student should be able to:

- Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate professionally acceptable coding and performancestandard
- Illustrate the basic principles of the object-orientedprogramming
- Demonstrate an introductory understanding ofgraphical user interfaces, multithreaded programming, and event-drivenprogramming.

Unit I

Introduction to Java : Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.
Objects and Classes : Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference.

Unit II

Inheritance and Polymorphism : Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTILpackage.

Unit III

Event and GUI programming : Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing, Creating a swing applet, swing controls and components.

Unit IV

I/O programming: Text and Binary I/O, Binary I/O classes, Object I/O, Random Access
Files. Event driven model, handling events

Unit V

Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.

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Text Books:

1) Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition,Pearson.
2) Programming in Java, SachinMalhotra&SaurabhChaudhary, Oxford University Press.

Reference Books:

1) Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman,SPD.
2) Core Java Volume-I Fundamentals, Eight Edition, Horstmann& Cornell, Pearson Education.
3) The Complete Reference, Java 2 (Fourth Edition), Herbert Schild,TMH.
Java Programming, D. S. Malik, CengageLearning.

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I Year - II Semester		L	T	P	C
		3	0	0	3
NETWORK ANALYSIS					

UNIT – I

Introduction to Electrical Circuits : Network elements classification, Electric charge and current, Electric energy and potential, Resistance parameter – series and parallel combination, Inductance parameter – series and parallel combination, Capacitance parameter – series and parallel combination. Energy sources: Ideal, Non-ideal, Independent and dependent sources, Source transformation, Kirchoff's laws, Mesh analysis and Nodal analysis problem solving with resistances only including dependent sources also. (Text Books: 1,2,3, Reference Books: 3)

Fundamentals and Network Topology: Definitions of terms associated with periodic functions: Time period, Angular velocity and frequency, RMS value, Average value, Form factor and peak factor- problem solving, Phase angle, Phasor representation, Addition and subtraction of phasors, mathematical representation of sinusoidal quantities, explanation with relevant theory, problem solving. Principal of Duality withexamples.

Network Topology: Definitions of branch, node, tree, planar, non-planar graph, incidence matrix, basic tie set schedule, basic cut set schedule. (Text Books: 2,3, Reference Books: 3)

UNIT – II

Transients : First order differential equations, Definition of time constants, R-L circuit, R-C circuit with DC excitation, Evaluating initial conditions procedure, second order differential equations, homogeneous, non-homogenous, problem solving using R-L-C elements with DC excitation and AC excitation, Response as related to s-plane rotation of roots. Solutions using Laplace transform method. (Text Books: 1,2,3, Reference Books: 1,3)

UNIT – III

Steady State Analysis of A.C Circuits : Impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving. (Text Books: 1,2, Reference Books: 3)

Coupled Circuits : Coupled Circuits: Self inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, Conductively coupled equivalent circuits- problem solving.

UNIT – IV

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth ofparallel resonance, general case-resistance present in both branches, anti resonance at all frequencies. (Text Books:2,3, Reference Books: 3)

Network Theorems: Thevinin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition,Max Power Transfer, Tellegens- problem solving using dependent sources also. (Text Books: 1,2,3, ReferenceBooks:2)

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UNIT – V

Two-port Networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h-parameters, Inverse h-parameters, Inverse Transmission line parameters, Relationship between parameter sets, Parallel connection of two port networks, Cascading of two port networks, series connection of two port networks, problem solving including dependent sources also. (Text Books: 1,2, Reference Books: 1,3)

TEXT BOOKS:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rdEdition,2000.
2. Network Analysis by K.Satya Prasad and S Sivanagaraju,CengageLearning
3. Electric Circuit Analysis by HaytandKimmarle,TMH

REFERENCES:

1. Network lines and Fields by John. D. Ryder 2nd edition, Asiapublishinghouse.
2. Basic Circuit Analysis by DR Cunninghan, Jaico Publishers.
3. Network Analysis and Filter Design by Chadha,UmeshPublications.

COURSE OBJECTIVES:

- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states and transients states inRLCcircuits.
- To know the basic Laplace transforms techniques inperiods'waveforms.
- To understand the two portnetworkparameters.
- To understand the properties of LC networksandfilters.

COURSE OUTCOME:

- gain the knowledge on basic networkelements.
- will analyze the RLC circuits behaviorindetailed.
- analyze the performance of periodicwaveforms.
- gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g).
- analyze the filter design concepts in realworldapplications.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

I Year - II Semester		L	T	P	C
		3	0	0	3
BASIC ELECTRICAL ENGINEERING					

Preamble:
This course covers various topics related to principle of operation and performance of various electrical machines.

Course Objectives:

- To understand the principle of operation, constructional details andoperational characteristics ofDCgenerators.
- To understand the principle of operation, characteristics of DC motor. Methodsof starting and speed control methods ofDCmotors.
- To learn the constructional details, principle of operation and performanceof transformers.
- To study the principle of operation, construction and details ofsynchronousmachines.
- To learn the principle of operation, constructional details, performance, torque – slip characteristics and starting methods of 3-phaseinductionmotors.

Unit I
DC Machines
Principle of operation of DC generator – emf equation – types of DC machines – torque equation of DC motor – applications – three point starter - losses and efficiency - swinburne's test - speed control methods – OCC of DC generator- Brake test on DC Shunt motor-numerical problems

Unit II
Transformers
Principle of operation of single phase transformer constructional features – EMF equation – Losses and efficiency of transformer- regulation of transformer – OC & SC tests predetermination of efficiency and regulations – Sumpner's test-NumericalProblems.

Unit III
Synchronous Generators
Principle of operation and construction of alternators – types of alternators Regulation of alternator by synchronous impedance method-EMF equation of three phase alternator

Synchronous Motors
Construction of three phase synchronous motor - operating principle –equivalent circuit of synchronous motor.

Unit IV
Induction Machine: Principle of operation and construction of three-phase induction motors – slip ring and squirrel cage motors – slip-torque characteristics – efficiency calculation – starting methods-Brake test on 3-Phase Induction Motor.

Unit V
Special Machines: Principle of operation and construction - single phase induction motor - shaded pole motors – capacitor motors and AC servomotor.

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Course Outcomes:

- Able to explain the operation of DC generator and analyze the characteristics of DC generator.
- Able to explain the principle of operation of DC motor and analyze theircharacteristics. Acquire the skills to analyze the starting and speed control methods ofDCmotors.
- Ability to analyze the performance and speed – torque characteristics of a3-phase induction motor and understand starting methods of 3-phaseinductionmotor.
- Able to explain the operation ofSynchronousMachines
- Capability to understand the operation of variousspecialmachines.

TEXT BOOKS*:*

1. Principles of Electrical Machines by V.K. Mehta &Rohit Mehta,S.Chandpublications
2. Theory & performance of Electrical Machines by J.B.Guptha, S.K.Kataria&Sons

REFERENCE BOOKS*:*

1.Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications
2.Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications,2nd edition
3. Basic Electrical Engineering by Nagsarkar,Sukhija, Oxford Publications,2ndedition

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I Year - II Semester		L	T	P	C
		0	0	3	1.5
ELECTRONIC WORKSHOP LAB					

I. Identificationofcomponents
II. Laboratoryequipment
III. Solderingpractice
IV. PCBLayout
V. TestingofComponents
VI. CRO

I. Identificationofcomponents:

- Resistors:- Types of Resistors, Value of Resistance using colorcode,DRBS.
- Capacitors:- Types of capacitors, value of capacitance using colorcode,DCBS.
- Inductors:- Types ofInductors,DLB
- Rheostats:- Types of Rheostats, Types ofpotentiometers,Relays.
- Switches:-TypesofSwitches.
- Cables: TypesofCables.
- Types ofInstrumentsused.

Identification of active elements.

(Two Terminal, Three Terminal Devices)

- (SC diode, Zenerdiode,D.AC)
- Three Terminal Devices: BJT, UJT, SCR, FET,MOSFET,TRIAC.
- Digital and Analog ICs. (TO and Flat packages) ICregulatorstypes.
- Testing of above components usingMultimeter.

II. LaboratoryEquipment:

A) Meters:-

- Types of Voltmeters, Types of Ammeters both AnalogandDigital.
- Types of Multi meters (Analog&Digital)
- AVO Meters.
- FETinputVoltmeter.

B) Laboratory Function Generators andAudioOscillators.
C) PowerSupplies.
D) RFgenerators.
E) Different TypesofTransformers. (Power, AF, RF,etc.)

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III. ***Solderingpractice***

Tools kit including soldering iron
Tools Kit:

- Insulatednoseplayer
- Insulatedcuttingplayer
- Screw driverkit
- Electricaltester
- Soldering iron,Lead,Flex

IV. ***PCB layoutandDesign.***

Materials required, centimeter graph sheets, marker.

V. ***Testing of Components.***

Active and Passive Components

VI. ***CRO***

Acquaintance with CRO
Measurements on CRO

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

I Year - II Semester		L	T	P	C
		0	0	3	1.5
BASIC ELECTRICAL ENGINEERING LAB					

Learning Objectives:

- To plot the magnetizing characteristics ofDC shunt generator and understand the mechanism ofself-excitation.
- To control the speed ofDCmotors.
- To determine and predetermine the performance ofDCmachines.
- To predetermine the efficiency and regulation of transformers and assesstheirperformance.
- To analyse performance of three phaseinductionmotor.
- To understand the significance of regulation of an alternators using synchronousimpedance method.

Any ten of the following experiments are to be conducted

1. Magnetization characteristics of D.C. Shunt generator.
2. Speed control of D.C.shuntmotor.
3. Brake test on DCshuntmotor.
4. Swinburne's test onDCmachine
5. Load test on DCshuntgenerator
6. Load test on DCseriesgenerator.
7. Separation of losses iunDCShuntmotor
8. OC & SC tests onsingle-phasetransformer
9. Sumpner's test on singlephasetransformer
10. Brake test on 3-phase Inductionmotor.
11. Regulation of alternator by synchronousimpedancemethod.

Learning Outcomes:

The student should be able to:

- Determine and predetermine the performance of DC machinesandtransformers.
- Control the DC shunt machines.
- Compute the performance of1-phasetransformer.
- Perform tests on 3-phase induction motor and alternator to determinetheirperformance characteristics.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION TECHNOLOGY

I Year - II Semester		L	T	P	C
		0	0	3	1.5
APPLIED PHYSICS LAB					

(Any 10 of the following listed experiments)

List of Applied Physics Experiments

1. Determination of thickness of thin object by wedgemethod.
2. Determination of radius of curvature of a given plano convex lens by Newton'srings.
3. Determination of wavelengths of different spectral lines in mercury spectrumusing diffraction grating in normal incidence configuration.
4. Determination of dispersive power of theprism.
5. Determination of dielectric constant using charging and dischargingmethod.
6. Study the variation of B versus H by magnetizing the magnetic material (B-Hcurve).
7. Determination of numerical aperture and acceptance angle of an opticalfiber.
8. Determination of wavelength of Laser light using diffractiongrating.
9. Estimation of Planck's constant using photoelectriceffect.
10. Determination of the resistivity of semiconductor by four probemethod.
11. To determine the energy gap of a semiconductor using p-n junctiondiode.
12. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee's Method
13. Determination of Hall voltage and Hall coefficient of a given semiconductor usingHall Effect .
14. Measurement of resistance of a semiconductor with varyingtemperature.
15. Resistivity of a Superconductor using four probe method & Meissnereffect.

References:

S. Balasubramanian, M.N. Srinivasan "A Text Book of Practical Physics"- S Chand Publishers,2017.

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I Year - II Semester		L	T	P	C
		3	0	0	0
ENVIRONMENTAL SCIENCE					

Course Objective:
Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I
Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. Curves.
Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.
Curves: Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents &normals for the curves.
Scales: Plain scales, diagonal scales and vernier scales

Unit II
Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.
Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.
Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces.

Unit III
Objective: The objective is to make the students draw the projections of the plane inclined toboth the planes.
Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

Unit IV
Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to both the planes.

Unit V
Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.
Computer Aided Design, Drawing practice using Auto CAD, Creating 2D&3D drawings of objects using Auto CAD

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Note: In the End Examination there will be no question from CAD.

TEXT BOOKS:

1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

Course Outcome: The student will learn how to visualize 2D & 3D objects.