CURRICULUM OF ELECTRICAL AND ELECTRONICS ENGINEERING
RGUKT BASAR
(Semester – II of the Academic Year 2016 – 17)

I YEAR
II SEMESTER

S.No	Subject Code	Subject Name	(L-T)-P	C
1	EE1202	Network Theory-II	4-1	4
2	CY1001	Chemistry	4-0	4
3	MA1201	Mathematics-II	4-0	4
4	CS1201	Scripting Languages	4-0	3
5	HS1001	English	4-0	4
6	HS1201	Communication Skills-II	2-0	1
7	EE1802	Network Theory Lab	0-3	2
8	CY1601	Chemistry Lab	0-3	2
9	HS1601	English Language Lab	0-3	2
Total Credits				**26**

L-Lectures, T-Tutorials, P-Practicals, C-Credits

EE1202 **NETWORK THEORY-II**

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

Internals: 40Marks **4-1-0-4**

Course Objectives:

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 network theorems, transient analysis and network topology etc.

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

Evaluate transient behavior of single port networks for DC and AC excitations.

Examine behavior of linear circuits using Laplace transform and transfer functions of single port and two port networks

Analyze electric circuits using Network Theorems and network topology (Graph theory)

UNIT- I:

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- II:

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 RL & R-C Networks to Pulse Excitation.

UNIT-III:

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- IV:

Transfer functions: poles and zeros; Elements of Filter Theory

Synthesis of Single –Port Networks

Positive real functions Hurwitz polynomials, Realization of passive LC –RL and RC networks using Foster and Caner forms.

UNIT- V:

Two port networks:

Driving point impedance and transfer functions of 1-port RLC – networks, Impedance, admittance, Transmission and hybrid parameters of two-port networks and their interrelationship

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.

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Text Books:

M.E Van Valkenburg "Network Analysis", Prentice Hall (India), 3rd Edition, 2012.
Chakrabarti "Circuit Theory (Analysis & Synthesis) ", Dhanpat Rai & Sons, 2010.

Reference Books:

Sudhakar and Shyammohan S Palli ,"Circuits & Networks", Tata McGraw- Hill, 2010.
N.Sreenivasulu, " Electric Circuits", REEM Publications, 2013.
William Hayt and Jack E. Kemmerly, " Engineering circuit analysis", Mc Graw Hill Company, 6th edition, 2005.
John Bird, Routledge, "Electrical Circuit Theory and Technology", Taylor & Fransis, 2007.

CY1001 **CHEMISTRY**

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

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

Objectives:

To understand the basic organic reactions and their mechanisms with examples
To understand the importance of the spectroscopy in determining the structures of chemical compounds
To understand the importance of electrochemistry in technical filed
To understand the rates of some of the reactions and derivation of their rate laws
To understand the phase rule with some examples

Unit1: Organic reactions and Mechanisms

Elimination reactions: types of elimination reactions. α-eliminations with examples, Reimer-Tiemann reaction and its mechanism, β-eliminations with examples, Hofmann elimination and Saytzeff elimination reactions and their mechanisms, Classification of β-eliminations into E1 and E2 reactions with examples, γ-elimination reactions with examples, Aldol condensation with mechanism.

Addition and Substitution reactions: Classification of addition reactions into electrophilic, nucleophilic and free radical addition reactions with examples and their mechanisms, Markonikov's law, anti-Markonikov's rule and Kharasch effect, Michael reaction, Skraup synthesis, Polyvinyl chloride synthesis and their mechanisms. Classification of substitution reactions into electrophilic, nucleophilic and free radical substitutions with examples and their mechanisms, S_N1 and S_N2 reactions with examples, S_E1 and S_E2 reactions with examples.

Bio-organic Reactions: amino acids and proteins, peptide bond formation and examples, methods of representing a peptide bond and its synthesis, Lipids, functions of lipids, classification of lipids, lipid metabolism, occurrence of lipids, properties of lipids, analysis of fats and oils.

Polymerization reactions: classification of polymerization, detailed reaction mechanism of free radical polymerization with examples, condensation polymerization reaction with mechanism, ionic polymerization with examples, classification of ionic polymerization into cationic and anionic polymerization.

Mechanism of catalytic reactions: catalyst definition, characteristics and types of catalysis, theories of catalysis, intermediate compound formation theory with examples and mechanism, drawbacks of intermediate compound formation theory, adsorption or contact theory with examples and mechanisms, enzyme catalysis, characteristics and mechanism of enzyme catalysis.

Unit 2: Spectroscopy

Introduction to spectroscopy, electromagnetic radiations, different types of spectroscopy, principle of spectroscopy, spectrophotometer

Microwave spectroscopy: principle, microwave spectra of diatomic molecules, selection rules for microwave spectra, applications of microwave spectroscopy: determination of bond length, dipole moment measurement, determination of isotopic mass of an element.

Infrared spectroscopy: introduction and principles of IR, types of vibrations: bending and stretching, Hooke's law for stretching vibrations, characteristic frequencies of common functional groups, IR instrumentation, interpretation and applications of IR spectrum with examples.

Ultra-violet spectroscopy: Introduction and principle of UV spectroscopy, color interpretation with VBT and MOT, types of electronic transitions, selection rules, chromophores and auxochromes with examples, conjugation effect, absorption and intensity shifts, applications of UV spectroscopy.

Unit 3: Electrochemistry

Types of electrodes: introduction, metal-metal ion electrodes, metal-insoluble salt-anion electrodes, calomel electrode, gas-ion electrodes, hydrogen and chlorine electrodes, oxidation-reduction electrodes, amalgam electrodes.

Types of cells: classification into chemical and concentration cells, chemical cells with transference and without transference, classification of concentration cells into electrolyte and electrode concentration cells, electrolyte concentration cells with and without transference, amalgam and gas concentration cells, examples for these cells.

EMF and applications of EMF: determination of pH, determination of the valency of the ions, potentiometric titrations.

Thermodynamic data: enthalpy and entropy of cell reactions, Gibbs-Helmholtz equation and applications.

Activity coefficients: fugacity and activity, their derivations, determination of activity and activity coefficients from cell potentials, ionic strength and its determination.

Solubility product: solubility and solubility product definitions, determination of solubility product using potentiometric and conductometric methods.

pH: definition of pH and determination of pH by various methods, acid-base titrations.

Corrosion: introduction, causes of corrosion, factors affecting the corrosion: nature of the metal and nature of the environment, thermodynamics of the corrosion, theories of corrosion: electrochemical/wet/immersion theory and chemical/dry/direct chemical attack theory.
Prevention of corrosion: protective coating - metal and nonmetal coatings, cathodic and anodic protection and their limitations, corrosion inhibitors – organic and inorganic inhibitors with examples.

Unit 4: Chemical kinetics

Complex reactions: definition and classification of complex reactions, definition of reversible reactions with examples, rate law derivation for reversible reactions.

Consecutive reactions: definition, rate law derivation and examples of consecutive reactions.
Parallel reactions: definition, rate law derivation and examples of parallel reactions.

Steady-state approximation: introduction, kinetic rate law derivation by applying steady state approximation in case of the oxidation of NO and pyrolysis of methane.
Chain reactions: introduction, types and mechanism of chain reactions, stationary and non-stationary chain reactions with examples, deriving the kinetic rate equation using a general chain reaction.
Photochemical reactions: introduction, Stark-Einstein law of photochemical equivalence, photophysical processes: IC, ISC, fluorescence and phosphorescence with examples, kinetic rate law derivation incase of photochemical decomposition of HI and photochemical combination of H_2 and Br_2.

Unit 5: Phase and reaction equilibrium

Phase equilibrium: introduction, definition of phase equilibrium, phase rule, definition and explanation of the terms used in the phase equilibrium: phase, components, degrees of freedom with examples, Lead – silver system.

Chemical equilibrium in mixture: energy changes, degree of advancement of reaction, effect of adding an inert gas on equilibrium.

Reference books:

1. Applied Chemistry – A textbook for engineers and technologist by H.D. Gesser
2. Engineering Chemistry: by P C Jain & Monika Jain
3. A Text Book of Engineering Chemistry: by Shashi Chawla
4. Fundamental of Organic Spectroscopy by Y. R. Sharma
5. Introduction to spectroscopy by Pavia, Lampman, Kriz

MA1201 **MATHEMATICS – II**

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

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

Objectives:

- To learn the concepts of Eigen values, Eigen vectors, vector spaces and its basis.
- To provide an overview of ordinary differential equations
- To study the methods of solving improper integrals and the concepts of multiple integrals
- To study vector differential and integral calculus

UNIT-I

Linear Algebra: System of Linear equations ,Vector spaces, Subspaces, Linear combination of vectors, linear dependence and independence of vectors, Basis and Dimension of Vector Space.

Linear transformations, Range and Kernel of Linear Transformations, Rank-Nullity theorem. Matrix representations of Linear Transformation.Eigenvalues and Eigenvectors of a Linear Transformation and their properties , Cayley - Hamilton Theorem, Hermitian and skew Hermitian matrices. Quadratic forms, reduction of quadratic form to canonical form by orthogonal transformation.

UNIT-II

Ordinary Differential Equations of first order: Exact first order differential equation, finding integrating factors, linear differential equations, Bernoulli's , Riccati , Clairaut's differential equations, finding orthogonal trajectory of family of curves, Newton's Law of Cooling, Law of Natural growth or decay.

UNIT-III

Ordinary Differential Equations of higher order: Linear dependence and independence of functions, Wronskian of n- functions to determine Linear Independence and dependence of functions, Solutions of Second and higher order differential equations (homogeneous & non-homogeneous) with constant coefficients, Method of variation of parameters, Euler-Cauchy equation.

UNIT-IV

Integral Calculus : Convergence of improper integrals, tests of convergence, Beta and Gamma functions - elementary properties, differentiation under integral sign, differentiation of integrals with variable limits - Leibnitz rule. Rectification, double and triple integrals, computations of surface and volumes, change of variables in double integrals - Jacobians of transformations, integrals dependent on parameters – applications.

UNIT-V

Vector Calculus : Scalar and vector fields, level surfaces, directional derivative, Gradient, Curl, Divergence, Laplacian, line and surface integrals, theorems of Green, Gauss and Stokes.

Text Books:

1.Advanced Engineering Mathematics (3rd Edition) by R. K. Jain and S. R. K. Iyengar, Narosa Publishing House, New Delhi

Suggested References:

1. Advanced Engineering Mathematics (8th Edition) by Erwin Kreyszig, Wiley-India.

2. Dr. M.D. Raisinghania, Ordinary and Partial differential equations, S.CHAND, 17th Edition 2014.

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

CS1201 **SCRIPTING LANGUAGES**

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

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

Prerequisites

1. Programming in C and Data Structures.

Objectives

1. To learn scripting languages- Python, Perl, PHP

Outcome

1. Student will be able to write dynamic web pages and will also be able to build a basic search engine using python and also search through text files using Perl.

UNIT-I

Python - Introduction-Variables, Strings, numbers, comments, Lists- introducing list, lists and looping, common list operations, removing items from list, numerical lists, list comprehensions, strings as lists, tuples, file I/O, functions, conditional statements and iterative statements.

UNIT –II

Python - Dictionaries, common operations with dictionaries, looping through dictionaries, nesting, classes, inheritance, modules and classes, exceptions and testing. Exceptions, sorting, introduction to standard libraries, building a Search Engine using all the above concepts.

UNIT-III

Perl – Data types, scalar functions, Quoting Basics, Functions, Control Structures, Inputs, Error Handling.

UNIT-IV

Perl – File input output, text processing functions, Hashes, DBM Databases, Regular Expressions.

UNIT- V

HTML – Styles, links, images, Static and Dynamic pages, Paragraphs and Fonts, Lists, CSS introduction, Introduction to HTML5 and semantics. PHP – Loops, String Functions, Email function, Data and time, Image Uploading, Error Handling.

Text Books:-

1. Programming Python, 4th Edition Powerful Object-Oriented Programming By Mark Lutz Learning Perl, Randal L Schwartz.
2. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech

HS1001 **ENGLISH**

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

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

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.
- To make them competent to attempt and qualify in various tests.
- To develop the study skills in formal and informal situations.

UNIT-I

What's Up? An Excerpt from The Hindu (September 29, 2015): Article,Tenses, Prepositions and Speech: A Revision -Common Errors in English Usage -Commonly Mispronounced Words -Punctuation

UNIT-II

The Nightingale and the Rose by Oscar Wilde : Recollecting the Rules of Spelling - Commonly Misspelt Words list -Dialogue writing: Seeking Permission, Requesting, Interrupting - Skimming and Scanning

UNIT-III

Phonetics : Consonants - Vowels – BBC Phonetic Transcription – Syllabification - Word Stress - Voiced and Voiceless - Rules of Pronunciation - Tongue Twisters

UNIT-IV

Malala's Speech: An Excerpt from www.noble.org (10 December 2014) :Interviews/Self-Introduction - Debate - Group Discussion

UNIT-V

A Missile Man – Dr. APJ Kalam: An Excerpt from The Hindu (Sept 25, 2006) -Binomials and Portmanteau - Words often Confused - Reading Comprehension - Affixes (Prefixes and Suffixes) - One Word Substitutes on How to Describe People -Homophones, Homonyms and Homographs - Antonyms and synonyms - Spotting the Error -Commonly Used Phrasal Verbs/Idioms

UNIT –VI

Anand's Super 30 for IIT - JEE : An Excerpt from The India Today (July 11,15): Essay Writing- How to Write a Report- Formats of report writing- Letter writing - Formal Letter - Informal Letter- Notice Writing - On various events e.g. Annual Day -Email writing - Emailing e.g. Formal and In Formal - Curriculum Vitae or Resume preparation

UNIT -VII

A Road Not Taken by Robert Frost : Understanding the Poem - Decision Making -Themes of the Poem -Figures of Speech –Simile- Alliteration- Onomatopoeia

UNIT –VIII

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

Supplementary Sources:

The King's Speech: Speech Therapy Tricks
Invictus: Inspirational Story
Lord of the Flies: Thematic Movie
Tangled: A Fairy Tale

- Debates from (BBC and NDTV)
- A course in Spoken English

HS1201 **COMMUNICATION SKILLS - II**

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

Internals: 40Marks **2-0-0-1**

Objectives:

- To complement the comprehensibility of the Technical subjects in a better way.
- To make them competent to attempt and qualify in various tests.

UNIT-I

Writing – Letter Writing **– Formal** – Inquiry – Application - Acceptance – Apology – Complaint – Seeking leave- **Informal - E mail –** Formal **- Speaking -** Introducing oneself - Introducing others - Asking for/giving directions **- Conversations** –Developing conversation skill in specific contexts (another sub-title is SITUATIONAL VARIATIONS IN TELEPHONE OPENINGS) – Leaving a message – How to make an appointment – **(Add more**) - Conversation Practice –-

Suggestions: Check the following site for better understanding - http://www.bbc.co.uk/worldservice/learningenglish/business/talkingbusiness/unit1telephone/1connecting.shtml

Suggested References:

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

EE1802 **NETWORK THEORY LAB**

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

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

1 Thevenin's, Norton's and Maximum Power Transfer Theorems
2 Superposition theorem
3 Verification of Compensation Theorem
4 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

Any two of the following simulation experiments

Simulation of DC Circuits
DC Transient response
Mesh Analysis
Nodal Analysis

CY1601 **CHEMISTRY LAB**

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

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

Objectives:

To learn the preparation of organic compounds in the laboratory
To estimate the hardness and alkalinity of the given sample of water
To understand the Job's method for determining the composition
Learns how to use the pH meter and polarimeter

Synthesis

Synthesis of soap from cheap oil.
Synthesis of Thiokol rubber

Volumetric analysis

Estimation of alkalinity of water
Estimation of total hardness of water by EDTA method

Job's method

Determination of composition of Ferric-Thiocyanate complex by Job's method

pH meter

Estimation of the strength of a weak acid by pH metry

Polarimeter

Determination of specific rotation of sucrose by polarimeter

Reference books:

College Practical Chemistry by V K Ahluwalia, Sunita Dhingra, Adarsh Gulati
Practical Engineering Chemistry by K Mukkanti
A Text Book of Engineering Chemistry: by Shashi Chawla
Essentials of Experimental Engineering Chemistry by Shashi Chawla
Comprehensive Practical Organic Chemistry – Preparation and Quantitative analysis byV K Ahluwalia, Renu Aggarwal

HS1601 **ENGLISH LANGUAGE LAB**

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

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

Objectives:

* To sensitize students to their communication skills.
* To make the students practice the language skills (L, S, R, W).

UNIT- I

Grammar – Adjectives – Comparatives and Superlatives – Adverbs – Countable and Uncountable Nouns – Pronouns – Simple present – Present continuous – Simple past- Conjunctions – Prepositions – Plurals – Articles a, an, the – Infinitive or –ing – Questions and Negatives -1 - Questions and Negatives -2

UNIT-II

Pronunciation – Pill/Fill – Buy/My – Tie/Die – Ship/Chip – Yet/ Jet – Game/ Came – Wail/Veil – Think/Sink – There/Dare – Price/ Prize – Asia/ Hard – Ran/Rang – Right/Light – Ship/Sheep – Head/Had- Schwa – Luck/ Look - Hat/Heart – But/Boot – Who/ Her – Pot/Port – Hair/ Hear – Pay/Pie – Boy/Buy – Know/ Now

UNIT-III

Writing – Writing a Thank You Letter – Writing about your life – Writing Instructions – Writing a Story – Writing an Essay – Writing a Business Letter – Writing a Film Review – Writing a Biography – Writing a Complaint Letter – Writing a Covering Letter - Writing a Pen friend Post - Writing about a Special Day - Writing an E-mail of Apology - Writing a Short Report - Writing a Post Card

UNIT – IV

Reading - The diamond thief – The guru and sweets – Taking a course – Reading a story - Using a dictionary – Making a journey – Reading a newspaper – Making friends – Reading an email – Finding information – A pen friend letter – The doctor says…- Choosing a holiday – Struck by lightning – Health matters :Yoga

UNIT – V

Listening – What shall we play? – An exciting weekend – A school outing – The morning assembly – Instructions on planting – Excuse me, can you lend me…- Manish's summer – Vignesh's hobby – What can I do for you? – What are you doing Ramesh? – I've got a few questions…- Geetha's day – Anil's new purchase – What are we having tonight? – What is the problem?

Suggested References:

1. Clarity English Success