Rajiv Gandhi University of Knowledge Technologies

Basar, Nirmal – 504107

B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

I YEAR II SEMISTER

Subject Code	Subject Name	L-T	P	C
EE1201	Electrical technology	4	-	4
CY1001	Chemistry	4	-	4
MA1201	Mathematics-II	4	-	4
CS1201	Scripting languages	4	-	4
HS1201	Communication Skills-II	2	-	1
CE1601	Engineering drawing	4	-	4
EE1801	Electrical technology Lab	-	3	2
HS1601	English Lab	-	2	2
CY1601	Chemistry Lab	-	3	2
	TOTAL	**22**	**8**	**27**

EE1201 Electrical Technology

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

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

Course Objectives:

1. To acquire the basic concepts of AC and DC Machines
2. To learn the basics of Alternators, Transformers.
3. To learn the measurement characteristics of Voltmeter, Ammeter, Wattmeter and Energy meter.

UNIT- I: THREE PHASE AC CIRCUITS

Three phase EMF generation, delta and Y connections, line and phase quantities, solution of three phase circuits, balanced supply voltage and balanced load, phasor diagram, measurement of power in three phase circuits, Three phase four wire circuits.

UNIT -II: TRANSFORMERS

Magnetic Circuits :

Ampere's circuital law, B- H curve, solution of magnetic circuits, hysteresis and eddy current losses, relays, an application of magnetic force, basic principles of stepper motor.

Transformers :

Construction, EMF equation, ratings, phasor diagram on no load and full load, equivalent circuit, regulation and efficiency calculations, open and short circuit tests, auto-transformers.

UNIT -III: INDUCTION MOTORS

The revolving magnetic field, principle of orientation, ratings, equivalent circuit, Torque-speed characteristics, starters for cage and wound rotor type induction motors.

UNIT -IV: DC MACHINES

Construction, EMF and Torque equations, Characteristics of DC generators and motors, speed control of DC motors and DC motor starters.

UNIT- V: ELECTRICAL MEASURING INSTRUMENTS

DC PMMC instruments, shunt and multipliers, multimeters, Moving iron ammeters and voltmeters, dynamometer, wattmeter, AC watthour meter, extension of instrument ranges.

TEXT BOOKS:

1. Electric machinery - A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5th edition
2. Electrical machines-PS Bhimbra, Khanna Publishers.
3. Electromechanics – II , by Kamakshaiah

REFERENCE BOOKS:

1. Performance and Design of AC Machines by MG.Say, BPB Publishers

2. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition.
3. Electric Machines –by I.J.Nagrath & D.P.Kothari,Tata Mc Graw Hill, 7th Edition.2005
4. Fundamentals of Electric Machines by B. R. Gupta, Vandana singhal, 3rd Edition, New age international Publishers
5. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, 5th Edition,
Reem Publications.
6. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co. Publications.

CY1001 CHEMISTRY

Externals: 60 Marks **L-T-P-C**
Internals: 40 Marks **4-0-0-4**

Objectives:

1. To understand the basic organic reactions and their mechnisms with examples
2. To understand the importance of the spectroscopy in determining the structures of chemical compounds
3. To understand the importance of electrochemistry in technical filed
4. To understand the rates of some of the reactions and derivation of their rate laws
5. 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_N^1 and S_N^2 reactions with examples, S_E^1 and S_E^2 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, spectrophotometerMicrowave spectroscopy: principle, microwave spectra of diatomic molecules, selection rules for microwave spectra, applications of microwave spectroscopy: determination of bond length, dipolemoment 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. orrosion: 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: 60Marks **(L-T)-P-C**

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

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
2. Learning Perl, Randal L Schwartz.
3. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech

HS1201 Communication Skills- II

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

Internals: **6-0-0-1**

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.
- To make them competent to attempt and qualify in various tests.

UNIT-I

Conversations – Introduction - Types of Conversations - Telephonic conversations – Typing messages - Strategies for Effectiveness - Conversation Practice

UNIT-II

Poetry Recitation - Reading to understand and express– Newspaper Review – Movie reviews – Gossip articles

UNIT-III

E-mail Writing– **Paragraph Writing - Essay Writing** – Descriptive Writing - Narrative Writing – **Picture perception**

Suggested References:

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

CE1601 ENGINEERING DRAWING

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

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

Objectives:

To understand the basic concepts of drawing and use of drafter.
To draw the basic geometrical constructions and curves used in engineering.
To understand and draw the projections of points, lines, planes and solids.
To know about isometric projections.

Concepts and conventions: Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning

UNIT-1

Plane curves and free hand sketching: Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves, Scales: Construction of Diagonal and Vernier scales. Visualization concepts and Free Hand sketching: Visualization principles – Representation of three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT-II

Projection of points, lines and plane surfaces: Orthographic projection- principles- Principal planes- First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces - Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method

UNIT-III

Projection of solids: Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

UNIT-IV

Projection of sectioned solids and development of surfaces: Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral

surfaces of solids with cut-outs and holes

UNIT V

Isometric and perspective projections: Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

Computer aided drafting (demonstration only)

Introduction to drafting packages and demonstration of their use.

Suggested Readings:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50 Edition, 2010.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age publications
3. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
4. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern EconomyEdition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
5. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age

EE1801 Electrical Technology Lab

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

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

List of Experiments:

1. Characteristics of Fluorescent and Incandescent Lamp
2. Verification of Network Theorems
3. R-L-C Series Circuit
4. Three phase power measurement by two Wattmeter method
5. Single Phase Energy Meter
6. OC and SC Test of Single Phase Transformer
7. OCC of separately excited DC Shunt Generator
8. Load test of Three Phase Induction Motor

HS1601 English Language Lab (ELL)

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

Internals: 40 Marks **6-0-0-2**

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

CY1601 CHEMISTRY LABORATORY

Externals: 60 Marks **L-T-P-C**
Internals: 40 Marks **0-0-2-2**

Objectives:

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

1. **Synthesis**
   i. Synthesis of soap from cheap oil.
   ii. Synthesis of Thiokol rubber

2. **Volumetric analysis**
   i. Estimation of alkalinity of water
   ii. Estimation of total hardness of water by EDTA method

3. **Job's method**
   i. Determination of composition of Ferric-Thiocyanate complex by Job's method

4. **pH meter**
   i. Estimation of the strength of a weak acid by pH metry

5. **Polarimeter**
   i. Determination of specific rotation of sucrose by polarimeter

Reference books:

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