



**T K R COLLEGE OF ENGINEERING & TECHNOLOGY**  
(Autonomous)

**B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING**

**I Semester**

S.No.	Course Code	Course Title	L	T	P	Credit
1	A41BS1	Mathematics-I	3	1	0	3
2	A41BS2	Engineering Chemistry	4	0	0	4
3	A41BS3	Engineering Physics-I	3	0	0	3
4	A41HS4	Professional Communication in English	3	0	0	3
5	A41ES5	Engineering Mechanics	3	0	0	3
6	A41ES6	Basic Electrical and Electronics Engineering	4	0	0	4
7	A41HS7	English Language Communication Skills Lab	0	0	3	2
8	A41ES8	Engineering Workshop	0	0	3	2
9	AMC01	NSS	0	0	0	0
		<b>Total</b>	<b>19</b>	<b>1</b>	<b>6</b>	<b>24</b>

**II Semester**

S.No.	Course Code	Course Title	L	T	P	Credit
1	A42BS1	Engineering Physic-II	3	1	0	3
2	A42BS2	Mathematics-II	4	1	0	4
3	A42BS3	Mathematics-III	4	1	0	4
4	A42ES4	Computer Programming in C	3	0	0	3
5	A42ES5	Engineering Graphics	2	0	4	4
6	A42BS6	Engineering Chemistry Lab	0	0	3	2
7	A42BS7	Engineering Physics Lab	0	0	3	2
8	A42ES8	Computer Programming in C Lab	0	0	3	2
9	AMC02	NCC/NSO	0	0	0	0
		<b>Total</b>	<b>16</b>	<b>3</b>	<b>13</b>	<b>24</b>



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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**MATHEMATICS-I**

**SEMESTER-I**

**Subject code: A41BS1**

**L/T/P C**

**3/1/0/ 3**

**Course Objectives:**

To learn

1. The concept of rank of a matrix and applying the same to understand the consistency and solving the linear systems.
2. The concept of Eigen values and Eigen vectors and reducing the quadratic forms in to their canonical forms.
3. Methods of solving the linear differential equations of first and higher order.
4. Partial differentiation, concept of total derivative.
5. Finding maxima and minima of a function of two variables.

**Course Outcomes:**

Upon Completion of the subject, students will be able to,

1. Write the matrix representation of a set of linear equations and to analyse the solution of a system of equations.
2. Find the Eigen values and Eigen vectors which come across under linear transformations.
3. Find the external values of a function of two variables with and without constraints.
4. Solve higher order Differential Equations and apply them for solving some real world problems.
5. Represent a function in series form using Maclaurins series.

**UNIT-I**

**Linear Systems of Equations:**

Rank, Echelon form, normal form, consistency and solution of linear systems, Gauss elimination, Gauss-Jordan and LU decomposition method.

**Applications:**

finding Current in Electrical Circuits.

## UNIT-II

### **Eigen values, Eigen Vectors and Quadratic Forms:**

Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, diagonalization, Quadratic forms, reduction of QF to Canonical form, rank and nature of the QF-Index and Signature.

## UNIT-III

### **Initial Value Problems and Applications:**

First order Linear Differential Equations, Bernoulli's Differential Equations,

#### **Applications:**

Newton's Law of Cooling, Law of Natural Growth and Decay, Orthogonal Trajectories.

### **Linear Differential Equations of higher order with constant coefficients:**

Non Homogeneous Terms with RHS of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $X$ ,  $e^{ax} V(X)$ ,  $X V(X)$ , Wronskian of functions Method of variation of parameters.

#### **Applications:**

Electrical Circuits.

## UNIT-IV

### **Differential Calculus:**

Mean Value Theorems-Rolle's Theorem - Lagrange's mean value theorem - Cauchy's mean value theorem - Generalized mean value theorem (all theorems statements and their verification). Taylor's series and Maclaurin's series, Taylor's and Maclaurin's series expansion of functions of two variables

## UNIT-V

### **Partial Differentiation:**

Introduction of partial differentiation, homogeneous function, Euler's theorem, total derivative, chain rule, functional dependence, Jacobian.

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

### **Text Books:**

1. A first course in differential equations with modeling applications by Dennis G. Zill, Cengage Learning publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.

### **Reference Books:**

1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher.
2. Engineering Mathematics by N. P. Bali, Lakshmi Publications.
3. Differential calculus by Shanti Narayan, S.Chand and Company publications.

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**ENGINEERING CHEMISTRY**

**SEMESTER-I**

**Subject code: A41BS2**

**L/T/P C**

**4/0/0/ 4**

**Course Objectives:**

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, significance of corrosion control to protect the structures, polymers and their controlled usage.
3. To acquire knowledge of engineering materials and about fuels and batteries.
4. To acquire required knowledge about engineering materials like cement, refractories and composites.

**Course Outcomes:**

1. Students will gain the basic knowledge of electrochemical procedures related to corrosion and its control.
2. They can understand the basic properties of water and its usage in domestic and industrial purposes.
3. They learn the use of fundamental principles to make predictions about the general properties of materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

**UNIT-I**

**Water and its treatment:**

Introduction - hardness of water - causes of hardness - types of hardness: temporary and permanent - expression and units of hardness - Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization. Defluoridation - Nalgonda technique - Determination of F<sup>-</sup> ion by ion- selective electrode method.

**Boiler troubles:**

Sludges, scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning - Softening of water by ion-exchange processes, Lime-Soda process. Desalination of water - Reverse osmosis. Numerical problems - Sewage water - Steps involved in treatment of sewage.

## UNIT-II

### **Electrochemistry and Batteries:**

#### **Electrochemistry:**

Electrode - electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen electrode, calomel and glass electrode. Nernst equation - electrochemical series and its applications. Electrochemical cells: Daniel cell - cell notation, cell reaction and cell emf - Concept of concentration cells - Electrolyte concentration cell - Numerical problems.

#### **Batteries:**

Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell).

#### **Fuel cells:**

Hydrogen –oxygen and methanol-oxygen fuel cells – Applications.

## UNIT-III

### **Polymers:**

Definition - Classification of polymers with examples - Types of polymerization - addition (free radical addition) and condensation polymerization with examples.

#### **Plastics:**

Definition and characteristics- thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection moulding). Preparation, Properties and engineering applications of PVC and Bakelite.

#### **Fibers:**

Characteristics of fibers - preparation, properties and applications of Nylon-6, 6 and Dacron. Fiber reinforced plastics (FRP) - Applications.

#### **Rubbers:**

Natural rubber and its vulcanization - compounding of rubber.

#### **Elastomers:**

Characteristics - preparation - properties and applications of Buna-S, Butyl and Thiokol rubber.

#### **Conducting polymers:**

Characteristics and Classification with examples - mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

#### **Biodegradable polymers:**

Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

## UNIT-IV

### **Fuels and Combustion:**

Classification- solid fuels: coal - analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels - petroleum and its refining, cracking - types - moving bed catalytic cracking. Knocking - octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels - composition and uses of natural gas, LPG, CNG and Biogas.

#### **Combustion:**

Definition, Calorific value of fuel - HCV, LCV; Calculation of air quantity required for combustion of a fuel.

## UNIT-V

### **Engineering Materials:**

#### **Cement:**

Portland cement, its composition, setting and hardening of Portland cement.

#### **Special cements:**

White cement, water proof cement, High alumina cement and Acid resistant cement.

#### **Refractories:**

Classification, characteristics of good refractories, Refractoriness, refractoriness under load, porosity and chemical inertness – applications of refractories.

#### **Lubricants:**

Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure) - properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

#### **Composites:**

Introduction - Constituents of composites - advantages, classification and constituents of composites. Applications of composites.

### **Text Books:**

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi (2010).
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016).

### **Reference Books:**

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015).
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011).
3. Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai (2016).

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING.**

**ENGINEERING PHYSICS-I**

**SEMESTER-I**

**Subject code: A41BS3**

**L/T/P C**

**3/0/0/ 3**

**Course Objectives:**

1. To understand interaction of light with matter through interference, diffraction and polarization.
2. To able to distinguish ordinary light with a laser light and to realize propagation of light through optical fibers.
3. To understand various crystal systems and their structures elaborately.
4. To study various crystal imperfections and probing methods like X-RD.

**Course outcomes:**

The student is able to

1. Realize the importance of light phenomena in thin films and resolution.
2. Learn principle, working of various laser systems and light propagation through optical fibers.
3. Distinguish various crystal systems and understand atomic packing factor.
4. Know the various defects in crystals.

**UNIT-I**

**Interference:**

Coherence, division of amplitude and division of wave front, interference in thin films (transmitted and reflected light), Newton's rings experiment.

**Diffraction:**

Distinction between Fresnel and Fraunhofer diffraction, diffraction due to single slit, N-slits, Diffraction grating experiment.

**UNIT-II**

**Polarization:**

Introduction, Types of polarization, Brewster's law, Malus's law, double refraction, Nicol prism, Quarter wave and half wave plates.

**Lasers:**

Characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, components of laser, ruby laser, helium – neon laser, semi-conductor laser, applications of lasers.

**UNIT-III****Fiber Optics:**

Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers in medicine and sensors and optical communication system.

**UNIT-IV**

**Crystallography:** Space lattice, unit cell and lattice parameters, crystal systems, Bravais lattices, atomic radius, co-ordination number and packing factor of SC, BCC, FCC, HCP and diamond, Miller indices, crystal planes and directions, inter planar spacing of orthogonal crystal systems.

**UNIT-V**

**X-ray Diffraction of crystal plane:** Bragg's law, X-ray diffraction methods: Laue method, powder method.

**Defects in crystals:**

Point defects: vacancies, substitutional, interstitial, Frenkel and Schottky defects, line defects (qualitative) and Burger's vector, surface defects: stacking faults, twin, tilt and grain boundaries and volume defects.

**Text Books:**

1. Engineering Physics Vol-I, K. Vijaya Kumar and S. Chandra Lingam, S. Chand and Co. Pvt. Ltd.
2. Engineering Physics-I, P.K.Palanisamy, Scitech Publications (INDIA) PVT LTD.
3. Engineering Physics, Dr.S.L.Gupta, Sanjeev Gupta, Dhanapat Rai Publications (P)LTD.
4. Introduction to Solid State Physics, Charles Kittel, Wiley Student edition.

**Reference Books:**

1. Physics Vol. 2, Halliday, Resnick and Kramer John wiley and Sons, Edition 4.
2. Waves, Frank S Crawford Jr, Berkeley Physics course, Volume 3.
3. Solid State Physics, AJ Dekker, MacMilan Publishers.
4. Engineering Physics, K. J. Pratap, et. al, New Age International Publishers.

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**PROFESSIONAL COMMUNICATION IN ENGLISH**

**SEMESTER-I**

**Subject code: A41HS4**

**L/T/P C**

**3/0/0/ 3**

**Course Objectives:**

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively using the theoretical and practical components of English syllabus.
- Develop study skills and communications skills in formal and informal situations.
- Improve the language proficiency through audio visual instruction.

**Course Outcomes:**

**The student is able to**

- Use English language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in formal and informal contexts.
- Able to develop the significance of silent reading and reading aloud, focusing on pronunciation sense of reading.

**Unit-I**

Chapter entitled '*Presidential Address*' by *Dr. A.P.J. Kalam* from "*Fluency in English– A Course book for Engineering Students*" published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Word Formation -- Root Words --The Use of Prefixes and Suffixes– Collocations– Exercises for Practice.

**Grammar:** Punctuation – Parts of Speech- Articles -Exercises for Practice.

**Reading:** *Double Angels* by David Scott-Reading and Its Importance- Techniques for Effective Reading- Signal Words- Exercises for Practice

**Writing:** Writing Sentences- Techniques for Effective Writing-- Paragraph Writing-Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices - Exercises for Practice

## Unit-II

Chapter entitled *Satya Nadella: Email to Employees on his First Day as CEO* from “*Fluency in English– A Course book for Engineering Students*” Published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Synonyms and Antonyms – Homonyms, Homophones, Homographs- Exercises for Practice (Chapter 17 ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press may also be followed.) **Grammar:** Verbs-Transitive, Intransitive and Non-finite Verbs – Mood and Tense - Gerund – Words with Appropriate Prepositions – Phrasal Verbs - Exercises for Practice.

**Reading:** Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading - *The Road Not Taken* by **Robert Frost** -- Exercises for Practice.

**Writing:** Letter Writing –Format, Styles, Parts, Language to be used in Formal Letters-Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition – Exercises for Practice.

## Unit-III

From the book entitled ‘*Technical Communication- Principles and Practice*’. *Third Edition* published by Oxford University Press.

**Vocabulary:** Introduction- A Brief History of Words – Using the Dictionary and Thesaurus– Changing Words from One Form to Another – Confusables (From Chapter 17 entitled ‘*Grammar and Vocabulary Development*’).

**Grammar:** Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive Voice- Conditional Sentences – Adjective and Degrees of Comparison. (From Chapter 17 entitled ‘*Grammar and Vocabulary Development*’).

**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author’s viewpoint (Inference) – Reader Anticipation: Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions. (From Chapter 10 entitled ‘*Reading Comprehension*’).

**Writing:** Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- Emails. (From Chapter 15 entitled ‘*Formal Letters, Memos, and Email*’).

## Unit-IV

Chapter entitled ‘*Good Manners*’ by *J.C. Hill* from *Fluency in English – A Course book for Engineering Students*” published by Orient Blackswan, Hyderabad.

**Vocabulary:** Idiomatic Expressions –One- word Substitutes --- Exercises for Practice (Chapter 17 '*Technical Communication- Principles and Practice*'. *Third Edition* published by Oxford University Press may also be followed.) **Grammar:** Sequence of Tenses- Concord (Subject in Agreement with the Verb) – Exercises for Practice.

**Reading:** '*If*' poem by **Rudyard Kipling**--Tips for Writing a Review --- Author's Viewpoint – Reader's Anticipation-- Herein the Students will be required to Read and Submit a Review of a Book (Literary or Non-literary) of their choice – Exercises for Practice.

**Writing:** Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc., -- Exercises for Practice. Introduction - Steps to Effective Precis Writing – Guidelines- Samples (Chapter 12 entitled '*The Art of Condensation*' from *Technical Communication- Principles and Practice. Third Edition* published by Oxford University Press).

## UNIT –V

Chapter entitled '**Father Dear Father**' by **Raj Kinger** from *Fluency in English – A Course book for Engineering Students*" Published by Orient BlackSwan, Hyderabad.

**Vocabulary:** Foreign Words—Words borrowed from other Languages- Exercises for Practice.

**Grammar:** Direct and Indirect Speech- Question Tags- Exercises for Practice.

**Reading:** Predicting the Content- Understanding the Gist – SQ3R Reading Technique-Study Skills – Note Making - Understanding Discourse Coherence – Sequencing Sentences. (From Chapter 10 entitled '**Reading Comprehension**' - *Technical Communication- Principles and Practice. Third Edition* published by Oxford University Press).

**Writing:** Technical Reports- Introduction – Characteristics of a Report – Categories of Reports –Formats- Prewriting – Structure of Reports (Manuscript Format) - Types of Reports - Writing the Report. (From Chapter 13 entitled '**Technical Reports**' - *Technical Communication- Principles and Practice. Third Edition* published by Oxford University Press).

**Textbooks** : Fluency in English – A Text book Referred by the University.

**Reference Books** : A Course in English Communication, Madhavi Apte.  
Effective Communication Skills, Dr. Ashraf Rizwi.  
Technical Communication by Meenakshi Raman.  
Objective English, Edgar Thorpe, Showick Thorpe.  
English Grammar, Raymond Murphy, Cambridge University Press.

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**Department of ELCTRONICS & COMMUNICATION ENGINEERING**

**ENGINEERING MECHANICS**

**SEMESTER-I**

**Subject code: A41ES5**

**L/T/P C**

**3/0/0/ 3**

**Course Objectives:**

- To understand the resolving forces and moments for a given force system
- To understand the representation of forces and momentum in a force system, by vectors and scalars and solve the system of forces and moment by use of mathematics.
- To analyze the types of friction for moving bodies and problems related to friction.
- To determine the centroid and second moment of area.
- To analyze the properties of plain and solid surfaces in relation to moment of Inertia.
- To illustrate the laws of motion, kinematics of motion and their relation.

**Course outcomes:**

Ability to resolve the force system in structural constructions.  
Ability to evolve the static and dynamic friction.  
Ability to analyse Mechanical vibrations.  
Ability to analyse the properties of solids in relation to moment of Inertia.

**UNIT-I**

**Introduction to Mechanics:**

Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

**UNIT-II**

**Friction:**

Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions-Motion of Bodies –Wedge & Screw friction, Ladder Friction.

### UNIT-III

#### **Centroid and Center of Gravity:**

Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

#### **Area moments of Inertia:**

Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration. Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

### UNIT-IV

#### **Mass Moment of Inertia:**

Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - **Virtual Work:** Theory of virtual work-Application.

### UNIT-V

#### **Kinetics:**

Kinetics of a particle-D'Alemberts principle-Motion in a curved path – work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, rotation-work done-Principle of work-energy-Impulse-momentum.

#### **Mechanical Vibrations:**

Definitions, Concepts-Simple Harmonic motion- free vibrations- Simple and compound pendulums

#### **Text Books:**

- 1) Engineering Mechanics: R.K.Bansal, Laxmi publications.
- 2) Engineering Mechanics: S.S.Bavakatti, New age International.

#### **Reference Books:**

- 1) A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain Academic Publishing Company.
- 2) Engineering Mechanics, Statics and Dynamics –S.Rajasekharan & G.SankaraSubramanian Vikas publications.
- 3).Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP.
- 4) Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall.
- 5) Engineering Mechanics / Bhattacharyya/ Oxford.
- 6) Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.
- 7) Engineering Mechanics: R.C.Hibbeler.

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

**SEMESTER-I**

**Subject code: A4IES6**

**L/T/P C**

**3/0/0/ 3**

**Course Objectives:**

To learn

- To introduce the concept of electrical circuits and its components
- To introduce the concepts of various semiconductor devices like diodes, transistors, FET's and MOSFET'S
- To impart the knowledge of various configurations, characteristics and applications of electric and electronic circuits

**Course Outcomes:**

After this course, the student will be able

- To analyze and solve electrical circuits using network laws and theorems.
- To identify and characterize the various semiconductor devices and different types of transistors.
- To design different biasing circuits of different semiconductor devices

**UNIT – I**

**Electrical Circuits:**

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

**Single Phase AC Circuits:**

R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R,L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance – phase and phase difference, Concept of power factor, j-notation, complex and polar forms of representation, series resonance and parallel resonance. Locus diagrams

## UNIT – II

### **Network Theorems:**

Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Millman's and Compensation theorems for DC and AC excitations.

## UNIT – III

### **P-N Junction Diode:**

Introduction to semiconductor physics, formation of p-type and n-type semiconductors, principle and operation of Diode, Current components in a p-n Diode, Band structure of open circuited p-n junction, Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

### **Special Purpose Devices:**

Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

## UNIT – IV

### **Rectifiers and Filters:**

P-N junction diode as a rectifier - Half Wave Rectifier, Ripple Factor, Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters,  $\pi$ - section Filters.

## UNIT – V

### **Bipolar Junction Transistor (BJT):**

Construction, Principle of Operation, Transistor current components, Transistor as a switch and as an Amplifier, Common Emitter, Common Base and Common Collector configurations and their Characteristics, Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors.

### **Field Effect Transistor (FET):**

Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET.

### **Metal Oxide Semiconductor Field Effect Transistor (MOSFET):**

Different types of MOSFET's, Working operation and V-I Characteristics of different types of MOSFET's.

**Text Books:**

1. Basic electrical engineering –JJ cathey / S A Nasar.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
3. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998.

**References:**

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University.
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath Mc Graw Hill Education.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press- 2004.
5. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

**SEMESTER-I**

**Subject code: A41HS7**

**L/T/P C**

**0/0/3 2**

**Course Objectives:**

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm.
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
- To improve the fluency of students in spoken English and neutralize their mother tongue influence.
- To train students to use language appropriately for public speaking, group discussions and interviews.

**Course Outcomes:**

1. Better understanding nuances of English language through audio-visual experience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking skills with clarity and confidence which in turn enhances their employability skills.
4. Able to communicate in formal and informal situations.

**Exercise – I**

**CALL Lab:**

*Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

*Practice:* Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker.

*Testing Exercises*

**ICS Lab:**

*Understand:* Spoken vs. Written language- Formal and Informal English.

*Practice:* Ice-Breaking Activity and JAM Session- Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

## **Exercise – II**

### **CALL Lab:**

*Understand:* Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Sentence Stress – Intonation.

*Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – Intonation.

*Testing Exercises*

### **ICS Lab:**

*Understand:* Features of Good Conversation – Strategies for Effective Communication.

*Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations, Making Requests and Seeking Permissions- pick “n” speak, effective vocabulary building and Telephone Etiquette.

## **Exercise – III**

### **CALL Lab:**

*Understand:* Errors in Pronunciation-the Influence of Mother Tongue (MTI).

*Practice:* Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

*Testing Exercises*

### **ICS Lab:**

*Understand:* Descriptions- Picture Description-Story Narrations- Giving Directions and Guidelines.

*Practice:* Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions. Describing people, places and things

## **Exercise – IV**

### **CALL Lab:**

*Understand:* Listening for General Details.

*Practice:* Listening Comprehension Tests.

*Testing Exercises*

### **ICS Lab:**

*Understand:* Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

*Practice:* Making a short speech-Extempore- Making a Presentation.

## Exercise – V

### CALL Lab:

*Understand:* Listening for Specific Details.

*Practice:* Listening Comprehension Tests.

*Testing Exercises*

### ICS Lab:

*Understand:* Group Discussion- Interview Skills.

*Practice:* Participation in Group Discussion and Mock Interviews.

## Minimum Requirement of infrastructural facilities for ELCS Lab:

### 1. Computer Assisted Language Learning (CALL) Lab:

**The Computer Assisted Language Learning Lab** has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

#### System Requirement (Hardware component):

- *Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:*
- Computers with Suitable Configuration
- High Fidelity Headphones

### 2. Interactive Communication Skills (ICS) Lab:

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio and video system and camcorder etc.

### Lab Manuals:

- 1) A book entitled “*ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities*” by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.
- 2) Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. “*EMBARK- English for undergraduates*” Delhi: Cambridge University Press. 2016. Print.

#### Suggested Software:

- 1) Cambridge Advanced Learners’ English Dictionary with CD.
- 2) Grammar Made Easy by Darling Kindersley.
- 3) Punctuation Made Easy by Darling Kindersley.
- 4) Oxford Advanced Learner’s Compass, 8<sup>th</sup> Edition.
- 5) English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- 6) English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- 7) TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS).

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**ENGINEERING WORKSHOP**

**SEMESTER-I**

**Subject code: A41ES8**

**L/T/P C**

**0/0/3 2**

**Course Objectives:**

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

**Course Outcomes:**

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

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

## **1. TRADES FOR EXERCISES**

- Carpentry
- Fitting
- Tin-Smithy and Development of jobs carried out and soldering.
- Black Smithy
- House-wiring
- Foundry
- Welding
- Power tools in construction, wood working, electrical engineering and mechanical Engineering.

## **2. TRADES FOR DEMONSTRATION & EXPOSURE**

- Plumbing
- Machine Shop
- Metal Cutting (Water Plasm)

### **Text Books:**

1. Workshop Practice /B. L. Juneja/Cengage.
2. Workshop Manual / K. Venugopal/Anuradha.

### **Reference Books:**

1. Work shop Manual P. Kannaiah/ K. L. Narayana/ Scitech.
2. Workshop Manual / Venkat Reddy/ BSP.

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**ENGINEERING PHYSICS II**

**SEMESTER-II**

**Subject code: A42BS1**

**L/T/P C**

**3/1/0 3**

**Course Objectives:**

1. To understand the behavior of a particle quantum mechanically.
2. To be able to distinguish pure and impure semi conductors and understand formation of P-N Junction.
3. To understand various magnetic and dielectric properties of materials.
4. To study super conductor behavior of materials.

**Course Outcomes:** After completion of this course the student is able to

1. Realize the importance of behavior of a particle quantum mechanically.
2. Learn concentration estimation of charge carriers in semi conductors.
3. Learn various magnetic dielectric properties and apply them in engineering applications.
4. Know the basic principles and applications of super conductors.

**UNIT - I**

**Principles of Quantum Mechanics:**

Waves and particles, de-Broglie hypothesis, matter waves, Davisson and Germer's experiment, Heisenberg uncertainty principle, Schrodinger time independent wave equation, physical significance of wave function, particle in 1-D potential box, electron in periodic potential, Kronig-Penny model (qualitative treatment), E-K curve, origin of energy band formation in solids.

**UNIT – II**

**Semiconductor Physics:**

Fermi level in intrinsic and extrinsic semiconductors, calculation of carrier concentration in intrinsic & extrinsic semiconductors, direct and indirect band gap semiconductors, formation of PN junction, open circuit PN junction, energy diagram of PN junction diode, Half wave and full wave rectifiers, solar cell: I-V characteristics and applications.

## UNIT – III

### **Dielectric Properties:**

Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic, ionic and orientation polarizations and calculation of their polarizabilities, internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-BaTiO<sub>3</sub> structure.

## UNIT - IV

### **Magnetic Properties:**

Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials, properties of antiferro and ferri magnetic materials,

**Superconductivity:** Superconductivity phenomenon, Meissner effect, Magnetic field effect, BCS theory, type-I and type-II super conductors applications of superconductivity.

## UNIT – V

### **Introduction to nanoscience:**

Origin of nanoscience, nanoscale, surface to volume ratio, quantum confinement, dominance of electromagnetic forces, random molecular motion, bottom up fabrication: Sol-gel, CVD and PVD techniques, top-down fabrication: ball mill method, characterization by XRD, SEM and TEM.

### **Text Books:**

1. Solid State Physics, A. J. Dekkar, Macmillan publishers Ind. Ltd.,
2. Solid State Physics, Chales Kittel, Wiley student edition.
3. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers.
4. Engineering Physics–II, P.K.Palanisamy, Scitech Publications (INDIA) PVT LTD.

### **Reference Books:**

1. Engineering Physics, Vol–II, K. Vijaya Kumar, S. Chandralingam S. Chand & Co. Pvt. Ltd.,
2. University Physics, Francis W. Sears, Hugh D. Young, Marle Zeemansky and Roger A Freedman, Pearson Education.
3. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.
4. Introduction to Quantum Mechanics Leonard I. Schiff McGraw-Hill

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**MATHEMATICS II**

**SEMESTER-II**

**Subject code: A42BS2**

**L/T/P C**

**4/1/0 4**

**Course Objectives:**

1. Concepts and properties of Laplace Transforms.
2. Solving DE using Laplace Transforms Techniques.
3. Evaluation of Integrals using Beta and Gamma functions.
4. Evaluation of multiple integrals and applying them to compute the volume and area of regions.
5. The physical Quantities involved in Engineering field related to the vector valued functions.
6. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

**Course Outcomes:**

Upon completion of the subject, students will be able to

1. Use Laplace Transform Techniques for solving DE's.
2. Evaluate integrals using Beta and Gamma functions.
3. Evaluate The Multiple Integrals and can apply these concepts to find areas, volumes, moment of inertia etc. of regions on a plane or in space.
4. Evaluate the Line, surface and volume integrals and converting them from one to another.

**UNIT-I**

**Beta and Gamma functions:**

Beta and Gamma functions, properties, relation between Beta and Gamma functions, Evaluation of integrals using Beta and Gamma functions.

**Applications:**

Evaluation of Integrals.

## UNIT-II

### **Multiple Integrals:**

Double and triple Integrals, change of variables, change of order of integration.

**Applications:** finding areas, volumes and center of gravity (evaluation using Beta and Gamma functions).

## UNIT- III

### **Vector Differentiation:**

Scalar and Vector point functions, Gradient, Divergence, Curl and their Physical and geometrical interpretation, Laplacian operator, vector identities.

## UNIT-IV

### **Vector Integration:**

Line integral, work done, potential function, area, surface and volume integrals, and vector integral theorems: Green's, Stoke's and Gauss divergence theorems (without proof) and related problems.

## UNIT-V

### **Laplace Transforms:**

Laplace transforms of standard functions, shifting theorems, derivatives and integrals, properties unit step function, Dirac's delta functions, periodic functions, Inverse Laplace transforms, convolution theorem (without proof).

**Applications:** Solving Ordinary Differential Equations (Initial Value Problems) using Laplace Transforms.

### **Text Books:**

1. Advanced Engineering Mathematics by R.K.Jain and S R K Iyengar, Narosa publishers
2. Engineering Mathematics by Srimantha Pal and Subodh C.Bhunia, Oxford publishers

### **Reference books:**

1. Advanced Engineering Mathematics by V.O.Neil, Cengage learning Publishers.
2. Mathematics by Lawrence Turyn, CRC Press.

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**MATHEMATICS III**

**SEMESTER-II**

**Subject code: A42BS3**

**L/T/P C**

**4/1/0 4**

**Course Objectives:**

This subject aims to

1. Random Variables that describe randomness of an uncertainty in certain realistic situation and Binomial Geometric and Normal Distributions.
2. Sampling Distribution of means, variance, point estimation and interval Estimation.
3. The testing of Hypothesis.
4. The topics those deals with methods to find roots of an equation and to fit a desired curve by the method of least squares for the given data.
5. Solving Ordinary Differential Equations using Numerical Techniques.

**Course Outcomes:**

Upon completion of the subject, students will be able to

1. Differentiate among many random variables involved in the probability models. It is quite useful for all branches of engineering.
2. To calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations.
3. Find the root of a given equation and solution of a system of equations
4. Fit a curve for a given data
5. Find the Integral values using Numerical Techniques.

**UNIT-I**

**Random Variable and Distributions:**

Introduction Random Variable, Discrete Random Variable, Continuous Random Variable, probability Distribution function, probability density function, Expectation, Discrete distributions: Binomial and Geometric Distributions, Continuous Distribution: Normal Distribution

## UNIT-II

Introduction, Population and samples, Sampling Distribution of means( $\sigma$ -Known), central limit theorem - t-distribution, sampling distribution of means ( $\sigma$ - unknown), sampling distribution of variances - Chi square and F-distributions, point estimation, maximum error of estimate, interval estimation.

## UNIT-III

### **Tests of Hypothesis:**

Introduction, Hypothesis, Null and Alternative Hypothesis, Type-I and Type-II errors, Level of Significance, One tailed and two-tailed tests, Tests of concerning one mean and proportion, two means proportions and their differences.

## UNIT-IV

### **Algebraic and Transcendental equations and Curve fitting:**

Introduction, Bisection method, Method of false position, Iteration Methods: Fixed point Iteration and Newton Raphson Methods. Solving linear system of equations by Gauss Jacobi and Gauss Seidal Method.

**Curve fitting:** Fitting a linear, second degree, exponential, power curve by method of least squares

## UNIT-V

### **Interpolation & Numerical Integration:**

Introduction, Finite differences, Newton's interpolation formulae, Gauss central difference formulae, Lagrange's interpolation.

### **Numerical Integration:**

Newton - Cotes Quadrature formula, Trapezoidal rule - Simpson's  $1/3^{\text{rd}}$  and  $3/8^{\text{th}}$  rule

### **Text Books:**

1. Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E Freund, New Delhi Prentice Hall.
2. Probability and Statistics for Engineers and Sciences by Jay L Devore, Cengage Learning
3. Numerical Methods for Scientific and Engineering Computation by M K Jain, S R K Iyengar and R K Jain, New age International Publishers

### **Reference Books:**

1. Fundamentals of Mathematical Statistics by S C Gupta and V K Kapoor, S Chand
2. Introductory Methods of Numerical Analysis by S S Sastri, P H I Learning Pvt Ltd  
Mathematics for Engineers and Scientists by Alan Jeffrey, 6<sup>th</sup> edition, C R C Press.

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**COMPUTER PROGRAMMING IN C**

**SEMESTER-II**

**Subject code: A42ES4**

**L/T/P C**

**3/0/0 3**

**Course Objectives:**

1. To learn the fundamentals of computers
2. To Understand the various steps in programme development
3. To learn the syntax and semantics of C Programming Language
4. To learn how to write modular and readable c Programmes
5. To learn to write programmes using structured programming approach in c to solve problems

**Course Outcomes:**

Upon completion of course the student will be able to

1. Demonstrate the basic knowledge of computer hardware and software
2. Write algorithms for solving problems
3. Draw flow charts for solving problems
4. Code a given logic in C programming language
5. Gain knowledge in using C language for solving problems.

**UNIT – I**

**Introduction to Computers:**

Data Representation, Number Systems, Computer Languages, Algorithms.

**Introduction to C Language:**

Data types, Operators, Expressions, Statements-Selection Statements – if and Switch Statements, Repetition (Loop) statements. Creative exercises.

**UNIT – II**

**Fundamentals of Data structures**

Linear and Non-Linear data structures, concepts of stacks and queues.

**Arrays**

One and two dimensional arrays, multidimensional arrays, inter function communication Arrays-applications- linear search, binary search, bubble sort, Implementation of stacks and queues. Creative exercises.

## UNIT – III

### **Functions:**

Scope and Extent, storage classes, recursive functions

### **Pointers:**

Introduction, Pointers for inter function communication, arrays of pointers, pointer arithmetic and arrays, passing an array to a function, memory allocation functions, pointers to functions. Pointers to pointers. Creative exercises

## UNIT – IV

### **Strings:**

Concepts, String Input/ Output functions, arrays of strings, string manipulation functions.

### **Enumerated types:**

Structure and Unions. Initialization, accessing structures, operations on structures. Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self-referential structures, unions, bit fields, C programming examples, command–line arguments, pre-processor commands. Creative Exercises

## UNIT V

### **Input and output:**

Concept of a file, streams, text files and binary files, file input/output functions (standard library input/output functions for files), error handling, positioning functions (fseek, rewind and ftell).

**Case studies** Scientific Calculator, student Information system, Employee information system, Search and Retrieval, Gaming.

### **Text Books:**

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Second Edition, Oxford University Press.

### **Reference Books:**

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
4. Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**ENGINEERING GRAPHICS**

**SEMESTER-II**

**Subject code: A42ES5**

**L/T/P C**

**2/0/4 4**

**Course objectives:**

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

**Course Outcomes:**

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

**UNIT – I**

**Introduction to Engineering Drawing:**

Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid Involute. Scales – Plain, Diagonal.

**UNIT- II**

**Orthographic Projections:**

Principles of Orthographic Projections – Conventions – Projections of Points and Lines  
Projections of Plane regular geometric figures, such as Triangle, Square, Rectangle, Pentagon, Hexagon and Circle.

**Auxiliary Views:**

Auxiliary Views of above and Traces.

**UNIT – III**

**Projections of Regular Solids:**

Projections of Regular Solids such as Tetrahedron, Cube, Octahedron, Prism and Pyramids.  
Solids of Base as Triangle, Square, Pentagon, Hexagon, Cone and Cylinder.

**Auxiliary Views:**

Auxiliary view of above

## UNIT – IV

### **Sections or Sectional views of Right Regular Solids:**

Cylinder, Cone, Square Prism and Pyramid, Rectangular Prism and Pyramid, Pentagonal Prism and Pyramid, Hexagonal Prism and Pyramid.

### **Auxiliary views:**

Sections of Sphere.

### **Development of Surfaces of Right Regular Solids:**

Cylinder, Cone, Square Prism and Pyramid.

## UNIT – V

### **Isometric Projections:**

Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions Auto CAD: Basic principles only.

### **Text books:**

- 1) Engineering Drawing / Basant Agrawal and Mc Agrawal/ Mc Graw Hill.
- 2) Engineering Drawing: Gopala Krishna, Subhas Stores.

### **Reference books:**

- 1) Engineering Drawing / N.S. Parthasarathy and Vela Murali/ Oxford.
- 2) Engineering Drawing N.D. Bhatt / Charotar.
- 3) Engineering Drawing/ M.B. Shah, B.C. Rane / Pearson.

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**ENGINEERING CHEMISTRY LAB**

**SEMESTER-II**

**Subject code: A42BS6**

**L/T/P C**

**0/0/3 3**

**LIST OF EXPERIMENTS**

**Volumetric Analysis:**

1. Estimation of Ferrous ion by Dichrometry.
2. Estimation of hardness of water by Complexometric method using EDTA.
3. Estimation of Ferrous and Ferric ions in a given mixture by Dichrometry.
4. Estimation Ferrous ion by Permanganometry.
5. Estimation of copper by Iodomery.
6. Estimation of percentage of purity of MnO<sub>2</sub> in pyrolusite
7. Determination of percentage of available chlorine in bleaching powder.
8. Determination of salt concentration by ion- exchange resin.

**Instrumental methods of Analysis:**

1. Estimation of HCl by Conductometry.
2. Estimation of Ferrous ion by Potentiometry.
3. Determination of Ferrous iron in cement by Colorimetric method.
4. Determination of viscosity of oil by Redwood / Oswald's Viscometer.
5. Estimation of manganese in KMnO<sub>4</sub> by Colorimetric method.
6. Estimation of HCl and Acetic acid in a given mixture by Conductometry.
7. Estimation of HCl by Potentiometry.

**Preparation of Polymers:**

1. Preparation of Bakelite and urea formaldehyde resin.

**Note:** All the above experiments must be performed.

**Text Books:**

1. Vogel's Text Book of Quantitative Chemical Analysis, 5th Edition (2015)
2. G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney.
3. A Text Book on experiments and calculations in Engineering Chemistry by S.S. Dara  
S. Chand & Company Ltd., Delhi (2003).

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**ENGINEERING PHYSICS LAB**

**SEMESTER-II**

**Subject code: A42BS7**

**L/T/P C**

**0/0/3 3**

**(Any TEN experiments compulsory)**

- 1) Dispersive power of the material of a prism – Spectrometer.
- 2) Determination of wavelengths of white source – Diffraction grating.
- 3) Newton's Rings – Radius of curvature of Plano convex lens.
- 4) Melde's experiment – Transverse and longitudinal modes.
- 5) Charging, discharging and time constant of an R-C circuit.
- 6) L-C-R circuit – Resonance & Q-factor.
- 7) Magnetic field along the axis of current carrying coil – Stewart and Gees method and to verify Biot – Savart's law.
- 8) Study the characteristics of LED and LASER diode.
- 9) Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
- 10) Energy gap of a material of p-n junction.
- 11) Torsional pendulum – Rigidity modulus.
- 12) Wavelength of light, resolving power and dispersive power of a diffraction grating using laser.
- 13) V-I characteristics of a solar cell.

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**Department of ELECTRONICS & COMMUNICATION ENGINEERING**

**COMPUTER PROGRAMMING IN C LAB**

**SEMESTER-II**

**Subject code: A42ES8**

**L/T/P C**

**0/0/3/ 2**

**Course Objective:**

- To write programs in C using structured programming approach to solve the problems.

**Course Outcomes:**

1. Ability to design and test programs to solve mathematical and scientific problems.
2. Ability to write structured programs using control structures and functions.

**Recommended Systems/Software Requirements:**

- Intel based desktop PC
- GNU C Compiler

1. a) Write a C program to find the factorial of a positive integer.  
b) Write a C program to find the roots of a quadratic equation.
2. a) Write a C program to determine if the given number is a prime number or not.  
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. a) Write a C program to construct a pyramid of numbers.  
b) Write a C program to calculate the following  
Sum:  $1-x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
4. a) The Least Common Multiple (LCM) of two positive integers a & b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls GCD (a, b) function that takes two integer arguments and returns their LCM. The lcm (a, b) function should calculate the least common multiple by calling the GCD (a, b) function and using the following relation:

$$\text{LCM (a,b)} = ab / \text{GCD (a,b)}$$

- b) Write a C program that reads two integers n and r to compute the ncr value using the following relation:
- $$\text{ncr}(n,r) = n! / r! (n-r)! .$$
- Use a function for computing the factorial value of an integer.
5. a) Write C program that reads two integers x and n and calls a recursive function to compute  $x^n$
- b) Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
- c) Write a C program that reads two integers and calls a recursive function to compute ncr value.
6. a) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
- b) Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.
7. a) Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
- b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.
8. a) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
- b) Write a C program that reads two matrices and uses functions to perform the following:
- i) Addition of two matrices
  - ii) Multiplication of two matrices
9. a) Write a C program that uses functions to perform the following operations:
- i) to insert a sub-string into a given main string from a given position.
  - ii) to delete n characters from a given position in a given string.
- b) Write a C program that uses a non-recursive function to determine if the given string is a palindrome or not.

10. a) Write a C program to replace a substring with another in a given line of text.
- b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
11. a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.
12. a) Write a C program to display the contents of a file to standard output device.
- b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
13. a) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.
- b) Write a C program to compare two files, printing the first line where they differ.
14. a) Write a C program to change the nth character (byte) in a text file. Use fseek function.
- b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.
15. a) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).
- b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

### Reference Books:

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
  2. Computer Programming in C, V. Rajaraman, PHI.
  3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
- C++: The complete reference, H. Schildt, TMH Publishers.