



**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

*Scheme of Instruction  
and  
Syllabi of*

**B.E. I & II - SEMESTERS**

**2015-2016**



**UNIVERSITY COLLEGE OF ENGINEERING**

(AUTONOMOUS)

OSMANIA UNIVERSITY

HYDERABAD – 500 007, TELANGANA



**BS 101 MT**

## **MATHEMATICS – I**

(Common to all branches)

*Credits: 3*

*Instruction: (3L + 1T) hrs per week*

*CIE: 30 Marks*

*Duration of SEE: 3 hours*

*SEE: 70 Marks*

### **Course Objectives:**

- *To introduce the concepts of sequences, series and their properties.*
- *To provide the knowledge of curve sketching.*
- *To introduce the concepts of functions of several variables and multiple integrals.*
- *To study vector differential and integral calculus*

### **UNIT – I**

**Sequences and Series:** Sequences, Series, General properties of series, Series of positive terms, Comparison tests, D'Alembert's ratio test, Raabe's test, Cauchy's root test, Alternating series, Series of positive and negative terms, Absolute convergence and Conditional convergence.

### **UNIT – II**

**Differential Calculus:** Rolle's theorem, Lagrange's and Cauchy's mean value theorems, Taylor's series, Curvature, Circle of curvature, Radius of curvature, Center of circle of curvature, Envelope of a family of curves, Asymptotes to a curve, Curve sketching.

### **UNIT – III**

**Functions of Several Real Variables:** Functions of two variables, Limits and continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions (Chain rules), Change of variables, Jacobian, Higher order partial derivatives, Taylor's series of functions of two variables, Maximum and minimum values of functions two variables, Lagrange's method of multipliers.

### **UNIT – IV**

**Multiple integrals:** Double integrals, Change of order of integration, Triple integrals, Change of variables in integrals and applications-areas and volumes.

### **UNIT – V**

**Vector Calculus:** Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, Line, Surface and Volume integrals, Green's theorem in a plane, Gauss's divergence theorem, Stoke's theorem (without proof).

### **Suggested Reading:**

1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 4<sup>th</sup> Edition 2014.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publications, 43<sup>rd</sup> Edition, 2014.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley, 9<sup>th</sup> Edition, 2012.
4. G.B. Thomas, Maurice Weir and Joel Hass, Thomas' Calculus, Peterson, 12<sup>th</sup> Edition, 2010.

**BS 102 PH**

**ENGINEERING PHYSICS-I**  
(Common to All Branches (Except for Mechanical))  
Credits: 3

*Instruction: (3L) hrs per week*

*CIE: 30 Marks*

*Duration of SEE: 3 hours*

*SEE: 70 Marks*

**Course Objectives:**

*The objective of the course is to acquire the knowledge on basic concepts in Physical Optics, Lasers, Fibre Optics, Wave mechanics, Statistical mechanics and Electromagnetic theory. It is also aimed at understanding various phenomena that are present in the course content and their applications in Engineering and Technology.*

**Course Outcomes:**

*On the completion of the course the student will acquire the basic knowledge and Understanding on the concepts that are involved in the contents incorporated in the syllabus and students will be able use them in Engineering fields.*

**UNIT- I**

**Interference:** Coherent and non-coherent sources - Division of amplitude and division of wave front - Interference in thin films (reflected light) - Newton's rings - Fresnel's biprism Diffraction: Distinction between Fresnel and Fraunhofer diffraction - Diffraction at a single slit - Double slit diffraction - Diffraction grating (N-slits)

**UNIT - II**

**Polarization:** Introduction - Malus's law - Double refraction - Nicol's prism - Quarter wave and half wave plates - Optical activity - Laurent's half shade polarimeter

**Lasers:** Characteristics of lasers - Spontaneous and stimulated emission of radiation -Einstein's coefficients - Population inversion - Ruby laser - Helium-Neon laser -Semiconductor laser - Applications of lasers. Basic principles of holography - Construction and reconstruction of image on hologram - Applications of holography

**UNIT- III**

**Fibre Optics:** Introduction - Propagation of light through an optical fiber - Critical angle - Acceptance angle - Numerical aperture (NA)- Types of optical fibers and refractive index profiles - Fibre drawing process (double crucible method)- Application of optical fibers

**Ultrasonics:** Introduction to Ultrasonic waves - Production of ultrasonic waves by Piezoelectric method - Detection of ultrasonic waves : Piezoelectric detector - Properties of Ultrasonics - Wavelength of Ultrasonics by Debye-Sears method - Applications.

**UNIT- IV**

**Elements of Statistical Mechanics:** Introduction - Ensembles - Phase space - Probability - Thermodynamical probability - Boltzmann's theorem on entropy and probability - Maxwell-Boltzmann statistics - Bose-Einstein statistics - Fermi-Dirac statistics - Photon gas - Planck's law of black body radiation distribution - Wien's law and Rayleigh Jeans law.

## **UNIT-V**

**Wave Mechanics:** Debroglie concept of matter waves – Debroglie wavelength – Physical significance and properties of wave function - Schrödinger time dependent and time independent wave equations - Particle in an Infinite Square well potential (Particle in a box). Electromagnetic theory: Review of steady and varying fields - Conduction and displacement current - Maxwell's equations in integral and differential forms - Electromagnetic waves: Plane wave – Poynting theorem.

### **Suggested Reading :**

1. Resnick, Halliday and Krane – Physics Volume 2, 5<sup>th</sup> Edition, Wiley-India (P) Ltd. (2007).
2. M.S. Avadhanulu and P.G. Kshirasagar – Engg. Physics, S. Chand & Co., 9<sup>th</sup> Ed. (2010).
3. R. Murugesan and K. Sivaprasath – Modern Physics, S. Chand & Co., 13<sup>th</sup> Ed. (2007).
4. R.K. Gaur and S.L. Gupta – Engg. Physics, Dhanpat Rai Publications, 8<sup>th</sup> Ed. (2001).
5. B.K. Pandey and S. Chaturvedi, *Engineering Physics*, Cenage Learning India (P) Ltd., 2012.

**BS 103 CH**

## **ENGINEERING CHEMISTRY - I**

(Common to all branches)

*Credits:3*

*Instruction: (3L) hrs per week*

*CIE: 30 Marks*

*Duration of SEE: 3 hours*

*SEE: 70 Marks*

### **Course Objectives:**

- *To acquaint a knowledge in thermodynamic principles and their applications*
- *To explore water softening methods and domestic water treatment*
- *To study the classification, preparation, properties and uses of polymers.*

### **Unit-I**

**THERMODYNAMICS:** Definition of the terms-system and surroundings. Types of thermodynamic systems and processes. State and path function. Extensive and Intensive properties. The concept of reversible and irreversible processes. Work done in isothermal and adiabatic reversible and irreversible processes. First law of thermodynamics and its limitations. Need for Second law and its statement. Spontaneous and non-spontaneous processes. The Carnot cycle, efficiency of reversible heat engine. Carnot theorem. Concept of entropy – entropy changes in reversible and irreversible processes. Physical significance of entropy. Gibbs and Helmholtz free energy and their significance. Variation of free energy with temperature and pressure. Criteria for spontaneity of a process in terms of entropy and free energy. Numerical problems.

### **Unit-II**

**PHASE RULE:** Definition of terms phase, component and degrees of freedom. Statement of Phase rule. Phase rule equation and its application to one component system - water system. Condensed phase rule and two components system - Pb-Ag system. Pattinson's process of desilverization of lead. Copper –Nickel(Cu-Ni) system.Safety fuses and Solders.

### **Unit-III**

**WATER CHEMISTRY:** Hardness of water – Types-units of hardness, estimation of temporary and permanent hardness of water by EDTA method. Alkalinity of water and its determination. Water softening by Ion exchange and Reverse Osmosis methods. Boiler troubles-scale and sludge formation-causes, effects and prevention. Priming and foaming. Specifications of potable water. Water treatment for drinking purpose-coagulation, sedimentation, filtration, sterilization by a) Chlorination b) Ozonolysis. Concept of break point chlorination. Numerical problems.

### **Unit-IV**

**POLYMER CHEMISTRY:** Definition of the terms-monomer, polymer, homo, co, homo-chain, hetero-chain and graft Co-polymers. Classification - natural and synthetic polymers, Addition and condensation polymers, thermo-plastic and thermosetting polymers, plastics, elastomers and fibers. Preparation, properties and engineering applications of the following polymers:

- Plastics:**PVC and Bakelite
- Fibers:** polyesters and polyamides- Nylon-6,6 and Kevlar
- Elastomers:** Natural rubber and its chemical structure, vulcanization of rubber and its significance. Buna-S and Butyl rubbers.

**Conducting polymers**-Introduction, mechanism of conduction in polymers. Intrinsic conducting polymers: Poly-acetylene and poly-aniline. Applications of conducting polymers.

**Unit-V**

**ENGINEERING MATERIALS:-I:Lubricants:** Definition, mechanism of lubrication. Hydrodynamic, Boundary and Extreme pressure lubrication. Classification of lubricants –solid, semi-solid and liquid lubricants- properties of lubricants: viscosity, viscosity index, saponification number and acid value.

**Refractories:** Definition –classification- Requirements of a good refractory material. Properties of Refractories: i) Refractoriness ii) Refractoriness under Load (RUL) iii) Porosity iv) Thermal Spalling.

**Clay Products:** Whitewares-manufacture, purpose and method of glazing.

**Suggested Reading:**

1. Principles of Physical Chemistry by Puri, Sharma and Pathania Vishal Publishing Co., Jhalandar, 44<sup>th</sup> Edn (2011)
2. Engineering Chemistry by P.C Jain & Monica Jain, , Dhanapathi Rai publishing Co. (2008)
3. Text book of Engineering Chemistry by Shashi Chawla, Dhanapathi Rai publishing Co. (2008)
4. Engineering Chemistry C. Parameshwara Murthy, CV Agarwal, Andra Naidu-, BS Publications
5. Engineering Chemistry by O.G. Palanna, TMH edn. New Delhi

ES 101 CE

## ENGINEERING MECHANICS - I

(Common to all branches)

Credits: 3

Instruction : (3L) hrs per week

CIE : 30 Marks

Duration of SEE : 3 hours

SEE : 70 Marks

### Course Objectives:

- To understand the resolution of forces, equilibrium and compatibility conditions of static loads
- To determine the various forces in the members, and analyze the sections using various methods
- To obtain friction, centroid, and moment of Inertia for various regular and irregular bodies

### UNIT-I

**Force Systems:** Resultant of collinear, parallel, coplanar and non-coplanar concurrent and non-concurrent force systems. Resolving a planar or non-coplanar force system into different directions. Moment of force and its applications, Couples and Wrench of a force system.

### UNIT -II

**Equilibrium of Force Systems:** Free body diagram, Equations of equilibrium, Equilibrium of planar and spatial system.

### UNIT -III

**Analysis of structures:** Analysis of trusses by method of joints and method of sections, Analysis of frames by method of members.

### UNIT -IV

**Friction:** Laws of friction. Application to simple systems, connected systems and belt friction. Wedge friction.

### UNIT -V

**Centroid and Moment of Inertia:** Centroids of lines, areas and volumes, Areas and volumes of revolution, Pappu's theorems and their applications, Area moment of inertia, Product moment of Inertia, Composite areas, radius of gyration.

### Suggested Readings:

1. Ferdinand L. Singer (1975). "Engineering Mechanic" *Collins, Singapore.*
2. Timoshenko, S.P. and D.H. Young. (1983). "Engineering Mechanics." *McGraw-Hill International Edition.*
3. Rajeshakharam, S. and Sankarasubrahmanyam, G. (2002). Mechanics." *Vikas Publications.*
4. Junarkar, S.B. and H.J. Shah. (2001). "Applied Mechanics, Publishers.
5. Shames, J.H (1987). "Engineering Mechanics", *Prentice Hall.*
6. Bhattacharyyya, B. (2015). "Engineering Mechanics." *Oxford Higher Education.*

ES 102 CS

## COMPUTER PROGRAMMING AND PROBLEM SOLVING

(Common to all branches)

Credits: 3

Instruction: (3L) hrs per week

CIE: 30 Marks

Duration of SEE: 3 hours

SEE: 70 Marks

### Course Objectives:

- To acquire problem solving skills
- To be able to develop flowcharts
- To understand structured programming concepts
- To be able to write programs in C Language

### UNIT – I

**Introduction to Computers:** Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flow charts. **Number Systems:** Binary, Octal, Decimal, and Hexadecimal.

**Introduction to C Language** - Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions.

### UNIT-II

Conditional Control Statements: Bitwise Operators, Relational and Logical Operators, If, If-Else, Switch-Statement and Examples. Loop Control Statements: For, While, Do-While and Examples. Continue, Break and Goto statements

**Functions:** Function Basics, User-defined Functions, Inter Function Communication, Standard Functions, Methods of Parameter Passing. **Recursion-** Recursive Functions.. **Storage Classes:** Auto, Register, Static, Extern, Scope Rules, and Type Qualifiers.

### UNIT – III

**Preprocessors:** Preprocessor Commands

**Arrays** - Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection and Bubble Sort.

### UNIT - IV

**Pointers** - Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Compatibility, Lvalue and Rvalue, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command-line Arguments.

**Strings** - Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions.

### UNIT - V

**Structures:** Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions, Type Definition (typedef), Enumerated Types.

**Input and Output:** Introduction to Files, Modes of Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

**Suggested Reading:**

1. B.A. Forouzan and R.F. Gilberg, "*A Structured Programming Approach in C*", Cengage Learning, 2007
2. Kernighan BW and Ritchie DM, "*The C Programming Language*", 2<sup>nd</sup> Edition, Prentice Hall of India, 2006.
3. Rajaraman V, "*The Fundamentals of Computer*", 4<sup>th</sup> Edition, Prentice-Hall of India, 2006.

MC 101 EG

## ENGINEERING ENGLISH

(Common to all branches)

*Credits: 1*

*Instruction : (3L) hrs per week*

*CIE : 30 Marks*

*Duration of SEE : 3 hours*

*SEE : 70 Marks*

### **Course Objectives:**

- *communicate clearly, accurately and appropriately*
- *know and use verbal and non-verbal communication appropriately*
- *infer information from texts*
- *learn basic grammar of the English language*
- *use appropriate idiomatic expressions, one word substitutes etc.*

### **UNIT – I**

**Effective Communication:** Role and importance of communication; Features of human communication; Process of communication; Importance of listening, speaking, reading, and writing, Types of listening, Tips for effective listening, Types of communication: Non-verbal communication, Verbal – Formal versus informal communication, One-way versus two-way communication; Barriers to communication

### **UNIT – II**

**Remedial English :** Common errors, Tense and aspects, Connectives and correlative conjuncts, Simple, complex and compound sentences, Voice, concord, Direct and indirect speech, Degrees of comparison, Question tags, Punctuation

### **UNIT - III**

**Written Communication :** Paragraph writing, Précis writing, Expansion, Essay writing, Personal Letters, General reports

### **UNIT – IV**

**Vocabulary:** Technical vocabulary, Homonyms, Homophones, Synonyms, Antonyms, Words often confused, One-word substitutes, Idiomatic usage, Affixes

### **UNIT – V**

Reading comprehension and reading strategies.

The following five lessons are prescribed:

1. Dr. A.P.J. Abdul Kalam
2. Sathya Nadella
3. Azim Premji
4. Sachin Tendulkar
5. Sam Pitroda

**Textbook Prescribed:**

E. Suresh Kumar, *Engineering English*, Orient Blackswan, 2014.

**Books Recommended:**

1. E. Suresh Kumar et al., *Communication Skills and Soft Skills*, Pearson, 2011.
2. Sanjay Kumar and Pushp Lata, *Communication Skills*, OUP, 2011.
3. Kavita Tyagi and Padma Misra, *Professional Communication*, PHI, 2011.
4. Meenakshi aman and Sangeeta Sharma, *Technical Communication: Principles and Practice*, OUP, 2011.

**BS 151 PH**

## **ENGINEERING PHYSICS LAB -I**

(Common to all branches)

*Credits: 1*

*Instruction: (2P) hrs per week*

*CIE: 25 Marks*

*Duration of SEE: 3 hours*

*SEE: 50 Marks*

1. **Biprism:** To determine the wavelength of the given monochromatic source of light using Fresnel's Biprism.
2. **Diffraction Grating:** To determine the wavelength of a spectral line by a plane transmission diffraction grating.
3. **Laser:** To determine the wavelength of laser using diffraction grating.
4. **Polarimeter:** To determine the specific rotation of sugar solution using Polarimeter.
5. **Ultrasonics :** To find the ultrasonic velocity in the given liquid using Debye Sears method.
6. **Fiber Optics-I:** (a) To determine the numerical aperture (NA) of the Optical Fiber.  
(b) To determine the losses in optical fiber due to i) bending and ii) coupling.
7. **Newton's Rings:** To determine the radius of curvature of a plano convex lens using Newton's rings experiment.
8. **e/m of an electron:** To determine the specific charge (e/m) of an electron by J.J. Thomson's method.
9. To study the double refraction characteristics of a crystal.

### **Demonstration Experiment:**

CRO – Measurement of amplitude, frequency and phase.

**BS 152 CH**

## **ENGINEERING CHEMISTRY LAB-1**

(Common to all branches)

*Credits: 1*

*Instruction: (2P) hrs per week*

*CIE: 25 Marks*

*Duration of SEE: 3 hours*

*SEE: 50 Marks*

### **VOLUMETRIC ANALYSIS**

1. Introduction to Volumetric Analysis.
2. Techniques of Weighing and usage of analytical balance

### **PERMANGANOMETRY**

3. Preparation of a standard solution of Oxalic acid or Sodium oxalate and standardization of  $\text{KMnO}_4$  solution
4. Preparation of standard solution of Mohr salt, standardization of  $\text{KMnO}_4$  solution and estimation of ferrous Iron in the given solution

### **DICHROMETRY**

5. Preparation of a standard solution of potassium dichromate, standardization of Mohr salt solution and estimation of dichromate in the given solution.
6. Estimation of ferrous and ferric ions in the given mixture by using standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution
7. Preparation of a standard solution of Potassium dichromate – Standardization of Mohr salt solution –determination of chemical oxygen demand.

### **ACIDMETRY**

8. Preparation of a standard sodium carbonate solution and standardization of hydrochloric acid and estimation of carbonate and bicarbonate in the given mixture.
9. Estimation of alkalinity of Water.

### **COMPLEXOMETRY**

10. Preparation of standard magnesium sulphate solution and standardization of EDTA solution and estimation of total hardness in the given sample of water.
11. Estimation of temporary and permanent hardness of water by the EDTA method.

### **Suggested Reading:**

1. “Vogel’s Text book of quantitative chemical analysis” J. Mendham and Thomas, Person education Pvt. Ltd. New Delhi 6<sup>th</sup> ed. 2002.

ES 151 CS

## COMPUTER PROGRAMMING LAB

(Common to all branches)

*Credits: 1*

*Instruction: (2P) hrs per week*

*CIE: 25 Marks*

*Duration of SEE: 3 hours*

*SEE: 50 Marks*

### **Course Objectives:**

- *To be able to understand the fundamentals of programming in C Language*
- *To be able to write, compile and debug programs in C*
- *To be able to formulate problems and implement in C.*
- *To be able to effectively choose programming components to solve computing problems in real-world.*

1. Finding the maximum and minimum of given set of numbers
2. Finding Roots of a Quadratic Equation
3. Sin x and Cos x values using series expansion
4. Conversion of Binary to Decimal, Octal, Hexa and Vice versa
5. Generating a Pascal triangle and Pyramid of numbers
6. Recursion: Factorial, Fibonacci, GCD
7. Matrix addition and multiplication using arrays
8. Bubble Sort, Selection Sort
9. Programs on Linear Search and Binary Search using recursive and non-recursive procedures.
10. Functions for string manipulations
11. Finding the No. of characters, words and lines of given text file
12. File Handling programs.

**ES 152 ME**

## **WORKSHOP PRACTICE-I**

(Common to all branches)

*Credits: 1*

*Instruction: (2P) hrs per week*

*CIE: 25 Marks*

*Duration of SEE: 3 hours*

*SEE: 50 Marks*

### **Course Objectives**

- *To understand the usage and applications of hand tools.*
- *To acquire the skills in pattern/model making.*
- *To familiarize with various work materials and tool materials.*

### **LIST OF EXERCISES**

#### **FITTING**

1. Marking and Punching
2. Cutting and Filing
3. Matching of two parts Including Scrapping
4. Drilling and Tapping

#### **HOUSE WIRING**

1. Single Lamp Controlled by Single Switch
2. Two Lamps Series Connection
3. Two Lamps Parallel Connection
4. Stairs Case Wiring Connection

#### **CARPENTRY**

1. Half lap Joint
2. Dove Tail Joint
3. Bridle Joint
4. Bridle Dove Tail Joint

#### **SHEET METAL WORKS**

1. Making a Funnel with G.I. Sheet
2. Making a tray with G.I. Sheet
3. Making Tee Joint with Metal Tubes
4. Making a Cylindrical Jug with Riveted Handle
- 5.

#### **Suggested Reading**

1. K.C. John, "Mechanical Workshop" 2<sup>nd</sup> Edn., PHI, 2010.
2. Hajra Choudary, "Elements of Workshop Technology-Vol. 1, Asian Publishers, 6<sup>th</sup> Edn., 1993.
3. G.S. Sawhney, "Mechanical Experiments and Workshop Practice", I.K. International Publishing House, New Delhi, 2009.

ES 153 CE

## ENGINEERING GRAPHICS-I

(Common to all branches)

Credits: 2

Instruction: (2P + 2Dr) hrs per week

CIE: 50 Marks

Duration of SEE: 3 hours

SEE: 50 Marks

### Course Objectives:

- To learn the engineering graphics through AutoCAD
- To evaluate the language of the drawing for-geometric constructions and to understand the engineering perspective of drawings.
- To understand projection of points and lines using 2-Dimensional drawing tools
- To learn the section of solids or object from various views / angles etc.,

### UNIT-I

**Introduction to Engineering drawing:** Size of Drawing Sheet, Drawing sheet format, Types of lines, lettering, types of dimensioning, Title Block, Engineering Scales. Free hand sketches: Sketch straight line, circles, arcs, and fillet.

**Introduction to AutoCAD:** Initial setup commands, utility commands, function keys, entity draw commands, display commands, edit commands, setting limits of sheet size, dimensioning and dimension style, Tile Block.

### UNIT-II

**Engineering curves:** Conic sections, Cycloids, Involutives.

**Projections:** Elements of projections, multi view projections, principal plane of projections, Methods of projections, first angle and third angle projection methods.

**Orthographic projections:** Concept of quadrant, projection of point, projection of a line inclined to one plane and parallel to other plane, line inclined to both the planes, lines parallel to profile plane, Traces of line.

### UNIT-III

**Projection of Planes:** Introduction, Types of planes, Traces of a planes, Projection of a planes parallel to one reference planes, projections of planes inclined to one reference planes and perpendicular to the other, projections of oblique planes.

**Auxiliary projections:** Types of auxiliary projection planes, Single and double auxiliary views.

### UNIT-IV

**Projection of Solids:** Introduction, Types of solids, Projection of solids in simple positions, Projections of solids axes inclined to one of the reference planes and parallel to the other, Axis inclined to the V.P. and parallel to the H.P. , Axis inclined to the H.P. and parallel to the H.P. and parallel to the V.P., Transfer of point from one view to other.

### UNIT-V

**Sections of Solids:** Introduction- Section planes, Sections, True shape of a section, Sections of Prisms, Sections of Pyramids, Sections of Cylinders, Sections of Cones and Sections of Spheres.

**Suggested Reading:**

1. Kulkarni, D.M., Rastogi, A.P. and Sarkar, A.K. (2013). "Engineering Graphics with AutoCAD." *PHI publications*, New Delhi.
2. Butt,N.D. (2011). " Engineering Drawing." *5<sup>th</sup> Edition, Charotar publishing house Pvt. Ltd.*
3. Sham Tickoo, and Saravanan, D. (2010). "AutoCAD 2010 for engineers and designers." *Dreamtech Press.*
4. Sham Tickoo. (2011). "AutoCAD 2011: A Problem solving approach" *Autodesk Press, USA*
5. Venugopal, K. (1998). "Engineering Drawing and Graphics + Autocad", *New Age International [P]Ltd.*, New Delhi.

MC 151 EG

## ENGINEERING ENGLISH LAB

(Common to all branches)

Credits: 1

Instruction: (2P) hrs per week

CIE: 25 Marks

Duration of SEE: 3 hours

SEE: 50 Marks

### Course Objectives:

To enable the students to

- learn the sound systems of English
- learn the word stress in English
- learn the rhythm and intonation of English
- improve their articulation skills and participation skills

Note: While teaching the following items, emphasis may be laid on intensive practice in the language lab. Lecturing may be avoided as far as possible.

1. **Introduction to English Phonetics:** Organs of Speech: the respiratory, articulatory and phonatory systems
2. **Sounds of English:** Phonemic sounds, Introduction to International Phonetic Alphabet, Classification and description of English phonetic sounds; Minimal pairs; The syllable
3. **Word Stress:** Primary stress, Secondary stress, Functional stress, Rules of word stress
4. **Aspects of Connected Speech:** Strong forms, Weak forms, Contracted forms, Elision
5. **Rhythm and Intonation:** Introduction of rhythm and intonation; Major patterns of intonation in English with their semantic implications; Difficulties of Indians speakers with stress and intonation
6. **Use of Dictionary and Thesaurus:** Advantages of using a dictionary and a thesaurus, Effective use of a dictionary and a thesaurus
7. **Speaking Activities:** JAM, Picture perception
8. **Listening Activities:** Activities based on listening
9. **PowerPoint Presentations:** General topics

### Lab Manual Recommended:

E. Suresh Kumar. *A Handbook for English Language Laboratories (with CD)*. Revised edition, Cambridge University Press India Pvt. Ltd. 2014

### Suggested Reading:

1. T. Balasubramanian. *A Text book of English Phonetics for Indian Students*. Macmillan, 2008.
2. Edgar Thorpe. *Winning at Interviews*. Pearson Education, 2006.
3. J. Sethi et al., *A Practical Course in English Pronunciation (with CD)*. Prentice Hall of India, 2005.
4. Hari Mohan Prasad. *How to Prepare for Group Discussions and Interviews*. Tata McGraw Hill, 2006.

## SCHEME OF INSTRUCTION

### B.E. (ECE) II - SEMESTER

S. No	Course Code	Course Title	Scheme of Instruction			Contact hr/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
<b>Theory</b>									
1	BS 201 MT	Mathematics - II	3	1	0	4	30	70	3
2	BS 202 PH	Engineering Physics- II	3	0	0	3	30	70	3
3	BS 203 CH	Engineering Chemistry -II	3	0	0	3	30	70	3
4	PC 201 EC	Electronic Devices	3	1	0	4	30	70	3
5	ES 221 ME	Elements of Mechanical Engineering	3	0	0	3	30	70	3
6	ES 221 EE	Basic Electrical Engineering	3	0	0	3	30	70	3
7	HS 201 EG	Business Communication and Presentation Skills	3	0	0	3	30	70	3
<b>Practicals</b>									
8	BS 251 PH	Engineering Physics Lab - II	0	0	2	2	25	50	1
9	BS 252 CH	Engineering Chemistry Lab -II	0	0	2	2	25	50	1
10	PC 251 EC	Electronic Devices Lab	0	0	2	2	25	50	1
11	ES 251 CS	Computer Skills Lab	0	0	2x2	4	25	50	2
12	HS 251 EG	Communication Skills Lab	0	0	2	2	25	50	1
<b>Total</b>			<b>21</b>	<b>2</b>	<b>12</b>	<b>35</b>	<b>335</b>	<b>740</b>	<b>27</b>

L : Lectures	T : Tutorials
P : Practicals	CIE : Continuous Internal Evaluation
SEE : Semester End Examination	BS : Basic Sciences
PC : Professional Core	ES : Engineering Sciences
HS : Humanities and Social Sciences	



BS 201 MT

## MATHEMATICS – II

(Common to all branches)

Credits:3

Instruction: (3L + 1T) hrs per week

CIE: 30 Marks

Duration of SEE: 3 hours

SEE: 70 Marks

### Course Objectives:

- To study matrix algebra and its use in solving system of linear equations and in solving eigen value problems
- To provide an overview of ordinary differential equations
- To introduce the concepts of functions of several variables and multiple integrals.
- To study vector differential and integral calculus

### UNIT – I

**Matrices** :Elementary row and column operations, Rank of a matrix, Echelon form, System of linear equations, Linearly dependence and independence of vectors, Linear transformation, Orthogonal transformation, Eigenvalues, Eigenvectors, Properties of eigenvalues , Cayley-Hamilton theorem, Quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation , Nature of quadratic forms.

### UNIT – II

#### Ordinary Differential Equations of First Order:

Exact first order differential equations , Integrating factors, Linear first order equations , Bernoulli's , Riccati's and Clairaut's differential equations , Orthogonal trajectories of a given family of curves.

### UNIT – III

#### Linear Differential Equations of Higher Order :

Linear independence and dependence, Solutions of second and higher order linear homogeneous equations with constants coefficients, Method of reduction of order for the linear homogenous second order differential equations with variable coefficients , Solutions of non-homogeneous linear differential equations, Method of variation of parameters , Solution of Euler-Cauchy equation, Simultaneous linear differential equations.

### UNIT – IV

#### Series Solutions of Differential equations:

Ordinary and Singular points of an equation, Power series solution , Series solution about a regular singular point, Frobenius method, Beta, Gamma and error functions

### UNIT – V

#### Special Functions:

Legendre's differential equation and Legendre's polynomials, Rodrigue's formula, Generating function for Legendre's polynomials  $P_n(x)$  , Recurrence relations for Legendre's polynomials  $P_n(x)$  , Orthogonal and Orthonormal functions, Orthogonal property of Legendre's polynomials  $P_n(x)$ , Bessel's differential equation and Bessel's functions, Derivatives and integrals of Bessel's functions, Recurrence relations for  $J_n(x)$ , Generating function for  $J_n(x)$ .

***Suggested Reading:***

- 1.R.K. Jain & S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 4th Edition, 2014.
- 2.Dr.B.S.Grewal, *Higher Engineering Mathematics*, Khanna Publications, 43rd Edition, 2014.
- 3.Dr.M.D.Raisinghania, *Ordinary and Partial differential equations*, S.CHAND, 17<sup>th</sup> Edition 2014.
- 4.Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley, 9<sup>th</sup> Edition, , 2012.

BS 202 PH

## ENGINEERING PHYSICS-II

(Common to all branches)

Credits:3

Instruction: (3L) hrs per week

CIE: 30 Marks

Duration of SEE: 3 hours

SEE: 70 Marks

### Course Objectives:

The aim of this course is to acquire the basic knowledge on elements of solid state physics. To understand the properties of semiconducting, superconducting, dielectric and magnetic materials in their bulk form. To acquire the knowledge on latest material characterization techniques such as X-ray Diffractometry (XRD), Scanning Electron Microscopy (SEM), Atomic Force microscopy (AFM) and Raman Spectroscopy. Also get introduction to basics of thin films and nano materials.

### Course Outcomes:

At the end of the course the student will acquire the knowledge on the properties of the materials in their bulk and thin forms. Student will apply his knowledge of the materials in selecting the materials for various engineering applications.

### UNIT- I

**Crystallography:** Crystal systems - Bravais lattices – Lattice planes and Miller Indices – Inter planar spacing - Bragg's law - Experimental determination of lattice constant by powder diffraction method. Crystal defects: Classification of defects - Concentration of Schottky defects in metals and ionic crystals - Concentration of Frankel defects.

**Band Theory of Solids:** Classical free electron theory (qualitative) – Energy band formation in solids Kronig-Penney model (qualitative treatment) - Electron gas - Fermi energy and Fermi level in metals - Classification of solids into conductors, semiconductors and insulators.

### UNIT - II

**Magnetic Materials:** Classification of magnetic materials: dia, para, ferro, antiferro and ferrimagnetic materials – Weiss molecular field theory of ferromagnetism - Magnetic domains - Hysteresis curve - Soft and hard magnetic materials – Ferrites: Applications of ferrites.

**Superconductivity:** Introduction - General properties of super conductors - Meissner effect - Type I and Type II superconductors - BCS theory (qualitative) – High  $T_c$  superconductors (in brief) - Applications of superconductors : Josephson's Junction and SQUIDS.

### UNIT- III

**Semiconductors:** Intrinsic and Extrinsic semiconductors - Concept of a hole - Concept of Fermi level in semiconductor - Carrier concentration and conductivity in intrinsic semiconductors – P-N junction diode and its I-V characteristics – Thermistor - Hall effect.

**Dielectric Materials:** Dielectrics - Types of dielectric polarizations – Electronic polarization, Ionic, Orientational and Space-charge polarizations – Expression for Electronic polarization - Frequency and temperature dependence of dielectric polarizations - Determination of dielectric constant by capacitance Bridge method - Ferro electricity - Barium titanate - Applications of Ferroelectrics.

#### **UNIT- IV**

**Techniques for characterization of materials:** Principles of X-ray fluorescence – Raman Spectroscopy - Atomic force microscopy - Electron microscopy (SEM).

**Thin films:** Distinction between bulk, thin films and nano materials - Thin film preparation techniques: Thermal evaporation methods, Electron beam evaporation - Applications of thin films - Solar cell.

#### **UNIT-V**

**Nanomaterials:** Zero dimensional materials - Properties of materials at reduced size - Surface to volume ratio at nano scale - Quantum confinement - Preparation of nanomaterials: bottom–up methods (sol gel and CVD), Top-down methods (ball milling) - Elementary ideas of carbon nanotubes – Applications.

#### ***Suggested Reading :***

- C. Kittel - *Introduction to Solid State Physics*, Wiley Eastern Ltd. 5<sup>th</sup> Edition, 1976.
- S.L. Gupta and V. Kumar - *Solid State Physics*, K. Nath & Co., 8<sup>th</sup> Edition, 1992.
- Goswami - *Thin Film Fundamentals*, New Age International, 2007.
- A.K Bhandhopadhyaya - *Nano Materials*, New Age International, 1<sup>st</sup> Edition, 2007.
- M.S. Avadhanulu and P.G. Kshirasagar - *Engg. Physics*, S.Chand & Co., 1<sup>st</sup> Edition, 1992.
- C.M. Srivastava and C. Srinivasan - *Science of Engg. Materials*, New Age International, 2002.

BS 203 CH

## ENGINEERING CHEMISTRY - II

(Common to all branches except BME)

Credits:3

Instruction: (3L) hrs per week

CIE: 30 Marks

Duration of SEE: 3 hours

SEE: 70 Marks

### Course Objectives:

- To study the various types of electrodes, cells and batteries & their applications.
- To study the various types of corrosion, the factors that influencing the corrosion & various corrosion controlling methods
- To study the various types of chemical fuels, composites & liquid crystals

### Unit-I

**ELECTROCHEMISTRY:** Electrolytic conductors-conductance, specific conductance, equivalent conductance and molar conductance. Cell constant, measurement of electrolytic conductance. Effect of dilution on various conductivities. Kohlrausch law and its applications – determination of  $\Lambda^\infty$  of weak electrolytes, solubility product and degree of dissociation. Principle and applications of conductometric titrations. Numerical problems.

Electrolytic and galvanic cells, cell notation, concept of electrode potential, single electrode potential and its determination. Electrochemical series and emf calculations. Types of electrodes- Hydrogen, Calomel, Quinhydrone and Glass electrode. Nernst equation and its applications. Determination of pH by using Quinhydrone and Glass electrodes. Principle and applications of Potentiometric titrations. Numerical problems.

### Unit-II

#### CHEMISTRY OF BATTERIES:

**Chemical Cells:** Primary batteries: Zn-Carbon battery. Secondary batteries: Lead-acid battery, Nickel-Cadmium battery-charging and discharging reactions and its applications. Modern Lithium batteries, advantages and applications.

**Solar Cells:** Concept of Solar energy conversion, Photovoltaic cells.

**Fuel Cells:** Concept of fuel cells and their advantages. H<sub>2</sub>-O<sub>2</sub> alkaline fuel cell and methanol-Oxygen fuel cell.

### Unit-III

**CORROSION AND ITS CONTROL:** Introduction, causes and effects of corrosion-Dry or chemical corrosion and wet or electro chemical corrosion and their mechanism. Pilling-Bedworth Rule and its significance. Types of electrochemical corrosion-Differential aeration, Galvanic, Waterline and Pitting corrosion. Factors effecting rate of corrosion: a) Nature of metal –galvanic series, over voltage, relative areas of anode and cathode, purity of metal, nature of surface oxide film b) Nature of environment-effect of temperature, effect of humidity and effect of pH.

**Corrosion control methods:** Cathodic protection –Sacrificial anode and impressed current cathode methods. Corrosion inhibitors-anodic and cathodic inhibitors.

**Surface Coatings:** Types of metallic coatings-anodic and cathodic coatings methods of application of metallic coatings: Hot-dipping, galvanizing, tinning and electroplating. Paints-constituents and their functions.

#### **Unit-IV**

**CHEMICAL FUELS:** Definition and Classification. Requirement of a good fuel, advantages, disadvantages of solid, liquid and gaseous fuels.

**Combustion:** Ignition temperature of a fuel. Calculation of air quantities by weight and volume required for the combustion of the fuels. Calorific value of the fuel-lower calorific value (LCV) Higher calorific value (HCV)-theoretical calculations of calorific value by Dulong's formula –Numerical problems.

**Solid Fuels:** Coal-Proximate and Ultimate analysis and its significance.

**Liquid fuels:** Source- fractional distillation of petroleum, important fractions, and their uses. Cracking and its significance. Catalytic cracking by moving bed method. Knocking, fuel rating- Octane and Cetane numbers.

**Gaseous fuels:** LPG, CNG composition and uses.

#### **Unit-V**

**ENGINEERING MATERIALS-II:Composites:** Introduction, constituents of composites. Types of composites-Fibre-reinforced, Particulate and Layered composites. Advantages and applications of Composites.

**Liquid Crystals:** Introduction, classification of liquid crystals, Thermotropic, Lyotropic liquid crystals. Chemical constitution and liquid crystalline behavior. Molecular ordering in liquid crystals. Nematic Smectic and Cholesteric liquid crystals and their applications.

**Insulators:** Thermal and Electrical- their Characteristics and applications.

#### ***Suggested Reading:***

1. *Engineering Chemistry* by PC Jain & Monica Jain, Dhanpat Rai Publications.
2. A Text book of *Physical Chemistry* by PL Soni, OP Dharmara, Sultan Chand & Sons.
3. *Engineering Chemistry* by Shashi Chawla, Dhanpat Rai Publications.
4. *Engineering Chemistry* by O.G. Palanna, TMH Publications, New Delhi
5. A text book of *Engineering Chemistry* by SS Dara, S.Chand & Co.
6. *Engineering Chemistry* by C. Parameshwara Murthy, CV Agarwal and Andra Naidu BS Public

PC 201 EC

## ELECTRONIC DEVICES

Credits: 3

Instruction : (3L + 1T) hrs per week  
CIE : 30 Marks

Duration of SEE : 3 hours  
SEE : 70 Marks

### Course Objectives:

- To understand the characteristics and applications of Diode.
- To understand the characteristics, configurations and biasing of transistors.
- To understand the characteristics and biasing of FET.
- To study the working of CRO.
- To study the working of Thyristors and their characteristics.

### UNIT-I

**Formation of PN Diode:** Types of materials, electrons and holes in an Intrinsic Semiconductor, Conductivity of a semiconductor, Carrier concentrations in an Intrinsic Semiconductor, Fermi level in an Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level in a semiconductor having impurities, Diffusion.

**PN Junction as a Diode:** band structure of an open circuited PN junction, Current components in a pn diode, Volt-ampere characteristics, Temperature dependence of pn characteristics, diode resistance, Transition capacitance, Diffusion capacitance, PN diode forward bias and reverse bias condition.

### UNIT -II

**Rectifiers:** Half-wave, Full-wave and bridge rectifiers and their performance characteristics. Design of rectifiers with filters ( L, C, LC and  $\pi$ ). Comparison of different rectifiers with and without filters.

### UNIT -III

**Bipolar Junction Transistors:** Junction transistor, Transistor current components, Current flow in BJT. CB, CE, CC configurations, Input and Output characteristics. Biasing of BJT: Operating point, Bias stability, Stability factor S, Types of Biasing circuits for BJT, Fixed bias, Collector-to-base bias and Self-bias methods. Bias Compensation techniques, Thermal Runaway, Thermal Resistance, Thermal Stability, Heat sink.

### UNIT -IV

**Field Effect Transistors:** JFET formation, FET operation, Pinch-off Voltage, V-I characteristics. Comparison of BJT and FET. MOSFET, Enhancement MOSFET and Depletion MOSFET and characteristics.

### UNIT -V

**Special Devices:** Zener diode, Tunnel diode, Varactor diode, Schottky diode, Photo diode and their Input- Output characteristics. SCR, Diac, Triac, UJT, CRO - Block diagram and its applications in Electronic measurements.

**Suggested Readings:**

1. Milliman, J. Halkais.C.C and Satyabrata Jit, “ *Electronic Devices and Circuits*”, 3<sup>rd</sup> edition, Tata Mcgraw-Hill, 2011.
2. J.B.Gupta, “ *Electronic Devices and circuits*”, Katson educational series, 4<sup>th</sup> edition , 2011.
3. Salivahan. S, Suresh Kumar.N “ *Electronic Devices and circuits*”, 3<sup>rd</sup> edition, Tata McGraw-Hill, 2012.

ES 221 ME

## ELEMENTS OF MECHANICAL ENGINEERING

(Common to ECE & EEE)

Credits: 3

Instruction: (3L) hrs per week

CIE: 30 Marks

Duration of SEE: 3 hours

SEE: 70 Marks

### Course Objectives:

- To understand basic concepts of thermodynamics.
- To understand applications of thermodynamics concepts.
- To understand the working principles of I.C. engines, Reciprocating compressors and Refrigeration
- To familiarize the design and working principles of drives transmission systems.
- To understand various manufacturing processes.

### UNIT – I

Statements of 0<sup>th</sup>, 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Laws of thermodynamics with their applications. Representation of thermodynamics processes on P-V and T-s plots. Ideal gas equation. Relations for internal energy and entropy changes, heat and work transfers for closed systems. Steady flow energy equation for an open systems-derivation and applications in turbines, compressors, nozzles and diffusers. Relations for enthalpy changes, heat and work transfers for open systems.

### UNIT-II

**Power Cycles:** Concept of air standard cycles- Otto, Diesel , Joule cycles with applications.

Representation of Cycles on P-V and T-s plots. Calculation of Cycle efficiencies.

**IC Engines:** Classification of IC Engines. Mechanical components of IC Engines. Working Principles of four stroke and two stroke cycle engines. Differences between petrol and diesel engines. Calculation of engine parameters -IP, BP, Specific fuel consumption, mechanical and thermal efficiencies.

### UNIT – III

Working principles of reciprocating air compressors-single and double acting, single stage and two stage. Effect of clearance. Conditions for maximum efficiency. Isentropic and isothermal efficiencies. Problems on work input, power required and efficiencies of single and two stage compressors. Methods for improving efficiency –use of intercooler and aftercooler.

Refrigeration: Carnot and Reversed Carnot Cycles-representation on T-s ,P-V and P-h Plots. Working principle of vapour compression refrigeration system. COP calculation. Common refrigerants in use.

### UNIT - IV

**Belt drives:** Velocity ratio, effect of slip, belt thickness and creep. Length of open and cross belts. Ratio of tensions, centrifugal tension and its effect on power transmission. **Gear drives:** Nomenclature and types of gears. Problems on simple , compound and epicyclic gear trains. **Governors:** Working of Watt, Porter and Hartnell governors. Effect and power of governor, Effect of friction. Stability of governor and isochronism. Balancing of several masses in one plane and in several planes.

**UNIT - V**

**Production Techniques:** Principles of Arc, Gas and Resistance welding, soldering and Brazing, Working mechanism of Lathe, milling and drilling machines by simple sketches. Working principle of NC machines. Basic principles of USM, EDM, LBM, EBM, ECM and Chemical machining and etching. Principles of sand casting, die casting and investment casting. Plastics and their moulding methods.

**Suggested Reading:**

1. R.K. Rajput, "Thermal Engineering", Laxmi Publications, New Delhi, Eighth Edition, 2010.
2. P.K. Nag, "Basic and Applied Thermodynamics", Tata Mc-Graw Hill, Eighth Reprint, 2006
3. Thomas Bevan, "Theory of Machines", College Book Store (CBS) Publishers, 3rd Edn., 1986.
4. Hajra Choudary, "Elements of Workshop Technology-Vol. I and 2, Asian Publishers, 6th Edn., 1993.
5. P. N. Rao, "Manufacturing Technology", Vol. I &2, Tata McGraw- Hill, 2nd Edn., 2009.

ES 221 EE

## BASIC ELECTRICAL ENGINEERING

(Common to ECE&CSE)

Credits: 3

Instruction : (3L) hrs per week  
CIE : 30 Marks

Duration of SEE : 3 hours  
SEE : 70 Marks

### Course Objectives:

- To acquire knowledge in circuits and principle operation of electrical machines.
- To be able to understand the tariff and safety measures.

### UNIT – I

**DC & AC Circuits :** Ohm's law, Kirchhoff's laws, Series & parallel circuits, Star & Delta conversions, Thevenin's, Norton's and Superposition theorems (analysis with DC excitation only).

**A.C. Circuits :** Production of sinusoidal voltage, Phasor representation of sinusoidal quantities, Average & rms values, Form factor, RLC circuits excited by sinusoidal input. Active & reactive power, power factor.

### UNIT – II

**3-Phase Balanced Circuits:** Star & Delta connections, Measurement of 3-phase power by two-wattmeter method.

**Single-Phase Transformer:** Principle of operation, Constructional details, Transformer on no-load and on load, OC & SC tests, Losses, Efficiency, Regulation.

### UNIT - III

**DC Generator:** Principle of operation, Constructional details, EMF equation, Types of generators, Armature reaction, No-load & Load characteristics, Losses & efficiency, Applications.

**DC Motor:** Principle of operation, Types of motors, Torque equation, 3-point starter, Characteristics of DC motors, Speed control of DC shunt motor, Losses & efficiency, Applications.

### UNIT – IV

**Three-phase Induction Motor:** Production of rotating field, Constructional details. Types of motors, Torque-slip characteristics, Star-delta starter, Auto-transformer starter, Losses & efficiency, Applications.

**Single-phase Induction Motors:** Principle of operation, Capacitor run & Capacitor start motor, Applications.

### UNIT – V

**Tariff & Electrical Safety Measures:** Types of Tariff: Simple tariff, Flat demand tariff, Flat rate tariff, Step rate tariff, Block rate tariff, Two-part tariff. Types of consumers and their tariff. Power Factor: Disadvantage of low P.F., Causes of low P.F., Improvement of P.F. by using Static Capacitors.

**Electrical Safety Measures:** Earthing and its Importance, Safety practices, Basic ideas of Fuse, Circuit Breaker, and relay.

**Suggested Reading:**

1. J.B.Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K.Kataria & Sons Publications, 2002.
2. J.B.Gupta, "Utilization of Electric Power and Electric Traction" S.K.Kataria & Sons Publications,2010
3. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, " Basic Electrical Engineering" Tata McGraw Hill, Publications,2009
4. Hughes, "Electrical Technology", VII Edition, International Student -on, Addison Welsey Longman Inc.,1995.

HS 201 EG

## BUSINESS COMMUNICATION SKILLS AND PRESENTATION SKILLS

(Common to all branches)

*Credits: 3*

*Instruction: (3L) hrs per week  
CIE: 25 Marks*

*Duration of SEE: 3 hours  
SEE: 50 Marks*

### **Course Objectives:**

*To enable the students to*

- *communicate clearly, accurately and appropriately*
- *learn different models of interpersonal communication*
- *work in teams effectively and learn how to be effective in using time*
- *comprehend the difference between technical and general writing*
- *write reports, scientific papers, letters, Statement of Purpose, Resume*
- *learn how to plan and prepare to face interviews effectively*

### **UNIT – I**

**Business Communication:** Importance of business communication; ABC of technical communication –Accuracy, Brevity, Clarity; Channels of communication: Downward communication, Upward communication, Diagonal communication, Horizontal communication; Organisational GDs

### **UNIT – II**

**Interpersonal Communication and Personality Development:** Models of interpersonal development, Johari window, Knapp's model, styles of communication; Team work; Persuasion techniques; Mobile Etiquette, e-mail Etiquette; Time Management

### **UNIT - III**

**Technical Written Communication:** Differences between Technical Writing and General Writing; Report Writing: Types of Reports, Structure/Format, Language Style, Writing Technical Reports; Writing Scientific Papers

### **UNIT – IV**

**Career Oriented Written Communication:** Writing SOPs; Job Application: Language style and Format; Résumé writing: design and style; Cover Letter; Business Letters: Letters of enquiry and responses, Letters of complaint, Letters of adjustment, Sales letters; Agenda and minutes of the meeting

### **UNIT – V**

**Interview Skills and Group Discussions:** Interviews: Purpose, Planning, Preparation, Language and style, Sample interview questions and answers; Group discussions: Types of GDs, Features of good GDs, Preparing for a group discussion

**Suggested Reading:**

1. E. Suresh Kumar, *Engineering English*, Orient Blackswan, 2014.
2. E. Suresh Kumar et al., *Communication Skills and Soft Skills*. Pearson, 2011.
3. E. Suresh Kumar et al., *English for Success*. Cambridge University Press India Private Ltd, 2010.
4. Sanjay Kumar and Pushp Lata. *Communication Skills*. OUP, 2011.
5. Kavita Tyagi and Padma Misra. *Professional Communication*. PHI, 2011.
6. Meenakshi Raman and Sangeeta Sharma. *Technical Communication: Principles and Practice*. OUP, 2011.

**BS 251 PH**

## **ENGINEERING PHYSICS LAB -II**

(Common to all branches)

*Credits: 1*

*Instruction: (2P) hrs per week*

*CIE: 25 Marks*

*Duration of SEE: 3 hours*

*SEE: 50 Marks*

- 1.Dielectric Constant:** To determine the dielectric constant and phase transition temperature of given material(PZT).
- 2.B-H Curve:** (a) To draw graph between the magnetising field and the intensity of magnetisation of a ferromagnetic specimen and (b) To determine i) Coercivity ii) Retentivity and iii) Hysteresis loss of given specimen (soft iron) from the graph.
- 3.P-N Junction Diode:** To draw the volt-ampere characteristics of the given P-N junction diode.
- 4.Photo Cell:** To determine the planck's constant and the work function of the photometal.
- 5.Thermister:** To draw the temperature characteristics of a thermistor and to evaluate the constants
- 6.Solar Cell:** To draw I-V characteristics of a solar cell and to calculate the (a) Fill factor (b) Efficiency and (c) Series resistance
- 7.Hall Effect:** To determine the (a) Hall coefficient (b) Carrier concentration and (c) Mobility of charge carriers of given semi conducting material.
- 8.ThermoElectricPower:**To calculate (a) Thermoelectric power (b) Fermi Energy and Carrier concentration of given ferrite sample.
- 9.Four Probe Method:** To determine the conductivity of semiconductors.

### **Demonstration Experiment:**

1. X – Ray Diffractometer
2. D.C. Conductivity
3. Preperation of Nano materils- Sol-gel method

**BS 252 CH**

## **ENGINEERING CHEMISTRY LAB - II**

(Common to all branches except BME)

*Credits: 1*

*Instruction: (2P) hrs per week*

*CIE: 25 Marks*

*Duration of SEE: 3 hours*

*SEE: 50 Marks*

### **INSTRUMENTAL ANALYSIS**

#### **CONDUCTOMETRY**

1. Conductometric and acid-base strong acid vs strong base titration
2. Conductometric weak acid vs strong base titration
3. Conductometric mixture of acids vs strong base titration
4. Conductometric precipitation titration-barium chloride against sodium sulphate

#### **POTENTIOMETRY**

1. Potentiometric acid-base titration –strong acid vs strong base, using quinhydrone electrode.
2. Potentiometric redox titration-KMnO<sub>4</sub> vs Fe<sup>+2</sup>

#### **pH Metry**

1. pH metry strong acid vs strong base titration
2. pH metry weak acid vs strong base titration

#### **COLORIMETRY**

1. Verification of Beer's Law –using Potassium permanganate
2. Estimation of KMnO<sub>4</sub>(Mn) in the given solution
3. Estimation of iron in cement

#### **KINETICS**

1. First order reaction-hydrolysis of methyl acetate
2. Second order reaction-potassium iodide and persulphate

#### **Suggested Reading:**

1. Senior practical Physical Chemistry, BD Khosla, A.Ghulati, VC.Garg., R.Chand and Co., New Delhi 10<sup>th</sup> ed. 2001.
2. Practical Physical Chemistry ,B.Vishwanathan, P.S Raghavan, Viva Books Private Limited.

PC 251 EC

## ELECTRONIC DEVICES LAB

Credits: 1

Instruction: (2P) hrs per week  
CIE: 25 Marks

Duration of SEE: 3 hours  
SEE: 50 Marks

### Course Objectives

- To understand the characteristics of Diode.
- To understand the input and output characteristics of different Transistor configurations.
- To understand the input and output characteristics of FET.
- To study the working of CRO.
- To study the characteristics of different devices, UJT, SCR.

### LIST OF EXERCISES

1. Study of CRO.
2. Static Characteristics of Diodes (Si, Ge)
3. Static Characteristics and voltage regulation of Zener Diode.
4. Ripple and Regulation characteristics of Half-wave, Full-wave and Bridge rectifiers.
5. Ripple and Regulation characteristics of Half-wave, Full-wave and Bridge rectifiers with Filters (C, L, LC and  $\pi$ )
6. Static Characteristics of CB Configuration of Transistor
7. Static Characteristics of CE Configuration of Transistor
8. Static and Transfer Characteristics of FET.
9. Static characteristics of CS configuration of FET.
10. Characteristics of special device UJT.
11. Characteristics of special device SCR.
12. Characteristics of Light emitting Diode and Photo diode.

### Suggested Reading

1. David Bell. A, Laboratory Manual for Electronic Devices and circuits, Prentice hall of India, 2001.
2. Robert L. Boylestad, Louis Nashelsky "Electronic Devices and Circuit Theory", 11<sup>th</sup> edition, Pearson Publishers, 2012

ES 251 CS

## COMPUTER SKILLS LAB

(Common to all branches)

Credits: 2

Instruction: (2P) hrs per week

CIE: 25 Marks

Duration of SEE: 3 hours

SEE: 50 Marks

### Course Objectives

- To learn assembling and disassembling of PC Hardware
- To understand the installation of Operating systems
- To be able to acquire skills in Productivity tools

### I:PC Hardware

1. Identify the peripherals of a computer. ( Processor, Memory chips, Mother board, Disk drives, and Controller card such as AGP board, Network cards, Sound card, as well as Parallel and Serial ports etc.,)
2. Disassembling and Assembling PC in working condition. Load the Operating Systems with partitions for Windows and Linux, configure for Network.

### II: Productivity Tools:

1. **Documentation Using MS-Word** - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, and Bookmarks.
2. **Presentation using MS-PowerPoint:** Creating presentation slides and Enhancing Slides with features like Organizational charts, Excel Charts, Word Art, Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object.
3. **MS Excel:** Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions- like sum, average, standard deviation, and charts.
4. **Internet and HTML:**
  - a) Telnet/Secure Shell (Remote login to university computers)
  - b) Electronic Mail (Communicating with email software)
  - c) File Transfer Protocols (transferring files between networked computers)
  - d) World Wide Web (Interface, Navigation, Search Tools)
  - e) Publishing Web Pages (Using HTML editors to create personal web sites)
  - f) Create the web-page (With title, text, frames, hyperlinks to some sites, pictures, lists, tables, fonts and colors) without using any web authoring tools.

- 5. Documentation Using LATEX:** Introduction to Linux Commands, Introduction to LateX, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar tool, Page Formatting, Single/Multi column, Pictures/Objects, Drawing, Hyperlinks, Header/Footer, and Tables.

**Suggestion Reading:**

1. Peter Norton, “*Introduction to Computers*”, 6<sup>th</sup> Edition, McGraw Hill Publishers,
2. Leslie Lamport, “*Latex: A Document Preparation System*”, 2<sup>nd</sup> Edition, Pearson Education India, 1994.
3. Stefan Kottwitz, “*LaTeX Beginner's Guide*”, Shroff/Packt Publishers, First Edition, 2012.

HS 251 EG

## COMMUNICATION SKILLS LAB

(common to all branches)

*Credits: 1*

*Instruction: (2P) hrs per week*

*CIE: 25 Marks*

*Duration of SEE: 3 hours*

*SEE: 50 Marks*

### **Course Objectives:**

*To enable the students to*

- *Learn the appropriate use of language*
- *Learn to use the appropriate body language*
- *Participate in group discussions and debates*
- *Improve their public speaking skills*
- *Improve their presentation and participation skills*
- *Learn how interviews are conducted and faced*

Note: While teaching the following items, emphasis may be laid on intensive practice in the language lab. Lecturing may be avoided as far as possible.

1. **Role play:** Use of dialogues in a variety of situations and settings
2. **Presentation Skills:** Making effective presentations, Expressions which can be used in presentations, Use of non-verbal communication, Coping with stage fright, Handling questions and answer session
3. **Public Speaking:** Planning, Preparation, Techniques of delivery, Handling stage fear/fright
4. **Group Discussion:** Initiating, continuing and concluding a GD, Giving feedback; Practising case studies and Topic based GDs
5. **Debate:** Differences between a debate and a group discussion, Essentials of a debate, Participating in a debate
6. **Interview Skills:** Facing interviews confidently, Use of suitable expressions during interviews; Mock interviews

### **Lab Manual Recommended:**

E. Suresh Kumar. *A Handbook for English Language Laboratories (with CD)*. Revised edition, Cambridge University Press India Pvt. Ltd. 2014

**Suggested Reading:**

1. T. Balasubramanian. *A Text book of English Phonetics for Indian Students*. Macmillan, 2008.
2. Edgar Thorpe. *Winning at Interviews*. Pearson Education, 2006.
3. J. Sethi et al., *A Practical Course in English Pronunciation (with CD)*. Prentice Hall of India, 2005.
4. Hari Mohan Prasad. *How to Prepare for Group Discussions and Interviews*. Tata McGraw Hill, 2006.

## **SERVICE COURSES**

ES 222 EC

## ELECTRONIC DEVICES AND CIRCUITS (BME) Credits: 3

*Instruction : (3L + 1T) hrs per week  
CIE : 30 Marks*

*Duration of SEE : 3 hours  
SEE : 70 Marks*

### **Course Objectives:**

- *To understand the characteristics and applications of Diode.*
- *To understand the characteristics, configurations and biasing of transistors.*
- *To understand the characteristics and biasing of FET.*
- *To study the working of CRO.*
- *To study the working of Thyristors and their characteristics.*

### **UNIT-I**

**Formation of PN Diode:** Types of materials, electrons and holes in an Intrinsic Semiconductor, Conductivity of a semiconductor, Carrier concentrations in an Intrinsic Semiconductor, Fermi level in an Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level in a semiconductor having impurities, Diffusion.

**PN Junction as a Diode:** band structure of an open circuited PN junction, Current components in a pn diode, Volt-ampere characteristics, Temperature dependence of pn characteristics, diode resistance, Transition capacitance, Diffusion capacitance, PN diode forward bias and reverse bias condition.

### **UNIT -II**

**Rectifiers:** Half-wave, Full-wave and bridge rectifiers and their performance characteristics. Design of rectifiers with filters (L, C, LC and  $\pi$ ). Comparison of different rectifiers with and without filters.

### **UNIT -III**

**Bipolar Junction Transistors:** Junction transistor, Transistor current components, Current flow in BJT. CB, CE, CC configurations, Input and Output characteristics.

**Biasing of BJT:** Operating point, Bias stability, Stability factor S, Types of Biasing circuits for BJT, Fixed bias, Collector-to-base bias and Self-bias methods. Bias Compensation techniques, Thermal Runaway, Thermal Resistance, Thermal Stability, Heat sink.

### **UNIT -IV**

**Field Effect Transistors:** JFET formation, FET operation, Pinch-off Voltage, V-I characteristics. Comparison of BJT and FET. MOSFET, Enhancement MOSFET and Depletion MOSFET and characteristics.

### **UNIT -V**

**Special Devices:** Zener diode, Tunnel diode, Varactor diode, Schottky diode, Photo diode and their Input- Output characteristics. SCR, Diac, Triac, UJT, CRO - Block diagram and its applications in Electronic measurements.

**Suggested Readings:**

1. Milliman, J. Halkais.C.C and Satyabrata Jit, “ *Electronic Devices and Circuits*”, 3<sup>rd</sup> edition, Tata Mcgraw-Hill, 2011.
2. J.B.Gupta, “ *Electronic Devices and circuits*”, Katson educational series, 4<sup>th</sup> edition , 2011.
3. Salivahan. S, Suresh Kumar.N “ *Electronic Devices and circuits*”, 3<sup>rd</sup> edition, Tata McGraw-Hill, 2012.

ES 221 EC

**ELECTRONIC ENGINEERING – I**  
**(EEE)**  
*Credits: 3*

*Instruction : (3L) hrs per week*  
*CIE : 30 Marks*

*Duration of SEE : 3 hours*  
*SEE : 70 Marks*

**Course Objectives:**

- *To understand the characteristics and applications of Diode.*
- *To understand the characteristics, configurations and biasing of transistors.*
- *To understand the characteristics and biasing of FET.*
- *To study the working of CRO.*

**UNIT-I**

**Semiconductors & Diodes:**

Energy bands, Intrinsic and Extrinsic Semiconductors, Mobility and Conductivity, Band structure of PN Junction, Quantitative Theory of PN Diode, Volt – Amp Characteristics, Temperature Dependence, Transition and Diffusion Capacitance of PN Junction, Zener Diode, Tunnel Diode, LED, Varactor Diode, Photo Diode.

**Diode Circuits:**

Diode as a rectifier-Half-wave, Full-wave and Bridge Rectifiers, types of Filters, Capacitor and inductor filter, zener diode as a voltage regulator, Ripple Factor and Regulation Characteristics.

**UNIT -II**

**Bipolar Junction Transistor:**

NPN and PNP junction Transistors, Transistor current components, CB, CE and CC Configurations and their Characteristics, Saturation, Cutoff and Active Regions, Comparison of CE, CB and CC Configurations, Maximum voltage rating, The operating point, fixed-bias, emitter stabilized bias circuits, Voltage-divider bias, DC bias with voltage feedback, Stabilization, Bias compensation, Thermal Runaway, Thermal Stability, High frequency model of a Transistor.

**UNIT -III**

**Small Signal – Low Frequency Transistor amplifier Circuits:**

Transistor as an Amplifier, Simplified CE and CC hybrid models, The h parameters of the three transistor configurations, Analysis of Transistor Amplifier Circuits using h-parameters. Linear analysis of a Transistor circuit, BJT transistor modeling parameters:  $Z_i$ ,  $Z_0$ ,  $A_v$ ,  $A_i$ . Miller's theorem and its duality, The CE amplifier with emitter resistance, Darlington pair, Analysis of Single Stage Amplifiers.

**UNIT -IV**

**Field Effect Transistors:**

The Junction field effect transistor, Pinch off Voltage, Volt-ampere characteristics, Drain Saturation Current, Small Signal model of FET, MOSFET – Enhancement and Depletion Modes. The low Frequency common source and common drain amplifiers, FET biasing.

**UNIT -V**

**Feedback Amplifiers:**

Concept of Feedback Amplifiers – Effect of Negative feed back on the amplifier Characteristics. Four Feedback Amplifier Topologies. Method of Analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers, Analysis of simple feed back amplifiers using BJT and FET, Design Considerations.

**Suggested Readings:**

1. Integrated Electronics Analog and Digital Circuits and systems, Jacob Millman and Christos C. Halkias, McGraw Hill.Edition1988.
2. Electronic Devices and Circuits Theory– Robert L Boylestad and Louis Nashelsky, Pearson Education.9th, Pearson publications,2009.
3. Electronics Principles, Albert Paul Malvino, Tata McGraw Hill Edition 2001.

**ES 241 EC**

**ELECTRONIC DEVICES AND CIRCUITS LAB  
(BME)**

*Credits: 1*

*Instruction: (2P) hrs per week  
CIE: 25 Marks*

*Duration of SEE: 3 hours  
SEE: 50 Marks*

**Course Objectives**

- *To understand the characteristics of Diode.*
- *To understand the input and output characteristics of different Transistor configurations.*
- *To understand the input and output characteristics of FET.*
- *To study the working of CRO.*
- *To study the characteristics of different devices, UJT, SCR.*

**LIST OF EXERCISES**

1. Study of CRO.
2. Static Characteristics of Diodes (Si, Ge)
3. Static Characteristics and voltage regulation of Zener Diode
4. Ripple and Regulation characteristics of Half-wave, Full-wave and Bridge rectifiers.
5. Ripple and Regulation characteristics of Half-wave, Full-wave and Bridge rectifiers with Filters (C, L, LC and  $\pi$ )
6. Static Characteristics of CB Configuration of Transistor
7. Static Characteristics of CE Configuration of Transistor
8. Static and Transfer Characteristics of FET.
9. Static characteristics of CS configuration of FET.
10. Characteristics of special device UJT.
11. Characteristics of special device SCR.
12. Characteristics of Light emitting Diode and Photo diode.

**Suggested Reading**

1. David Bell. A, Laboratory Manual for Electronic Devices and circuits, Prentice hall of India, 2001.
2. Robert L. Boylestad, Louis Nashelsky "Electronic Devices and Circuit Theory", 11<sup>th</sup> edition, Pearson Publishers, 2012