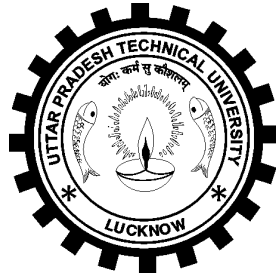# U.P. TECHNICAL UNIVERSITY LUCKNOW



**Syllabus**

**[Effective from the Session : 2008-09]**

# B.TECH. COURSES

**[Common to all Branches of B.Tech. 1st Year except B.Tech. Agricultural Engg. ]**

**B. Tech. First Year (common to all B. Tech. Courses except B.Tech. Agricultural Engg.)**
**[Effective from the session 2008-09]**
**YEAR I, SEMESTER-I**

| S. No. | Course Code | SUBJECT | PERIODS | | | Evaluation Scheme | | | | ESE | Subject Total | Credit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SESSIONAL EXAM. | | | | | | |
| | | | L | T | P | CT | TA | Total | | | | |
| **THEORY** | | | | | | | | | | | | |
| 1. | EAS-103 | Mathematics-I | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | 150 | 4 |
| 2. | EAS-101 | Engg. Physics-I | 2 | 1 | 0 | 15 | 10 | 25 | | 50 | 75 | 3 |
| 3. | EAS-102/ EME-102 | Engg. Chemistry/ Engg. Mechanics | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | 150 | 4 |
| 4. | EEE-101/ ECS-101 | Electrical Engg. / Computer Concepts & Programming in C | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | 150 | 4 |
| 5. | EEC-101/ EAS-104 | Electronics Engineering / Professional Communication | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | 150 | 4 |
| 6. | EME-101/ EAS-105 | Manufacturing Processes/ Environment & Ecology | 2 | 0 | 0 | 15 | 10 | 25 | | 50 | 75 | 2 |
| 7. | EAS-109 | *Remedial English Language** | *2* | *0* | *0* | - | - | - | | *50** | *50** | *0* |
| **PRACTICAL/TRAINING/PROJECT** | | | | | | | | | | | | |
| 8. | EAS-152/ EME-152 | Engg. Chemistry Lab/ Engg. Mechanics Lab | 0 | 0 | 2 | 10 | 10 | 20 | | 30 | 50 | 1 |
| 9. | EEE-151/ ECS-151 | Electrical Engg Lab / Computer Programming Lab | 0 | 0 | 2 | 10 | 10 | 20 | | 30 | 50 | 1 |
| 10. | EWS-151/ ECE-151 | Workshop Practice/ Computer Aided Engg. Graphics | 0 | 1 | 3 | 10 | 10 | 20 | | 30 | 50 | 2 |
| 11. | EAS-151/ EAS-154 | Physics Lab / Professional Communication Lab | 0 | 0 | 2 | 10 | 10 | 20 | | 30 | 50 | 1 |
| | | | 0 | 0 | 2 | 30 | 20 | 50 | | - | 50 | 1 |
| 12. | GP-101 | General Proficiency | - | - | - | - | - | 50 | | - | 50 | 1 |
| | | **Total** | **18** | **6** | **9** | **190/210** | **140/150** | **380/410** | | **670/640** | **1000** | **27** |

*Remedial English language is compulsory Audit-course. Candidate has to secure minimum 30% pass marks*

*L    - Lecture*
*T    - Tutorial*
*P    - Practical*
*CT   - Cumulative Test*
*TA   - Teacher's Assessment*
*ESE  - End Semester Exam.*

**B. Tech. First Year (common to all B. Tech. Courses except B.Tech. Agricultural Engg.)**
**[Effective from the session 2008-09]**
## YEAR I, SEMESTER-II

| S. No. | Course Code | SUBJECT | PERIODS | | | Evaluation Scheme | | | ESE | Subject Total | Credit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SESSIONAL EXAM. | | | | | |
| | | | L | T | P | CT | TA | Total | | | |
| **THEORY** | | | | | | | | | | | |
| 1. | EAS-203 | Mathematics-II | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 4 |
| 2. | EAS-202 | Engg. Physics-II | 2 | 1 | 0 | 15 | 10 | 25 | 50 | 75 | 3 |
| 3. | EME-202/ EAS-202 | Engg. Mechanics/ Engg. Chemistry | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 4 |
| 4. | ECS-201/ EEE-201 | Computer Concepts & Programming in C / Electrical Engg. | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 4 |
| 5. | EAS-204/ EEC-201 | Professional Communication/ Electronics Engineering | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 | 4 |
| 6. | EAS-205/ EME-201 | Environment & Ecology/ Manufacturing Processes | 2 | 0 | 0 | 15 | 10 | 25 | 50 | 75 | 2 |
| **PRACTICAL/TRAINING/PROJECT** | | | | | | | | | | | |
| 7. | EME-252/ EAS-252 | Engg. Mechanics Lab/ Engg. Chemistry Lab | 0 | 0 | 2 | 10 | 10 | 20 | 30 | 50 | 1 |
| 8. | ECS-251/ EEE-251 | Computer Programming Lab/ Electrical Engg. Lab | 0 | 0 | 2 | 10 | 10 | 20 | 30 | 50 | 1 |
| 9. | ECE-251/ EWS-251 | Computer Aided Engg. Graphics/ Workshop Practice | 0 | 1 | 3 | 10 | 10 | 20 | 30 | 50 | 2 |
| 10. | EAS-254/ EAS-251 | Professional Communication Lab/ | 0 | 0 | 2 | 30 | 20 | 50 | - | 50 | 1 |
| | | Physics Lab | 0 | 0 | 2 | 10 | 10 | 20 | 30 | 50 | 1 |
| 11. | GP-201 | General Proficiency | - | - | - | - | - | 50 | - | 50 | 1 |
| | | **Total** | **16** | **6** | **9** | **210/190** | **150/140** | **410/380** | **590/620** | **1000** | **27** |

# EAS-103 - MATHEMATICS –I

|  | L | T | P |
|---|---|---|---|
|  | 3 | 1 | 0 |

**Unit - I : Differential Calculus-I**
Leibnitz theorem, Partial differentiation, Eulers theorem, Curve tracing, Change of variables, Expansion of function of several variables.

**Unit – II : Differential Calculus-II**
Jacobian, approximation of errors, Extrema of functions of several variables, Lagranges method of multipliers (Simple applications).

**Unit – III : Matrices**
Elementary row and column transformation, Rank of matrix, Linear dependence, Consistency of linear system of equations and their solution, Characteristic equation, Caley-Hamition theorem, Eigen values and eigen vectors, Diagonalisation, Complex and unitary matrices, Application of matrices to engineering problems.

**Unit – IV : Multiple Integrals**
Double and triple integral, Change of order, Change of variables, Beta and Gamma functions, Application to area, volume, Dirichlet integral and applications.

**Unit – V : Vector Calculus**
Point function, Gradient, divergence and curl of a vector and their physical interpretations, Line, surface and volume integrals, Statement and problems of Green's, Stoke's and Gauss divergence theorems (without proof).

**Test Books:-**
1. B.V.Ramana, Higher Engineering Mathmatics, Tata Mc Graw-Hill Publishing Company Ltd., 2008.
2. R.K.Jain & S.R.K.Iyenger, Advance Engineering Mathematics, Narosa Publishing House, 2002.

**Reference Books:-**
1. B.S.Grewal, Engineering Mathematics, Khanna Publishers, 2004.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
3. E.Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
4. C.Ray Wylie & Louis C. Barrett, Advanced Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd. 2003
5. Peter V. O'Neil, Advanced Engineering Mathematics, Thomson (Cengage) Learning, 2007.

## EAS-101 : ENGINEERING PHYSICS-I

**L  T  P**
**2  1  0**

### Unit – I

### Relativistic Mechanics:

Inertial & non-inertial frames, Michelson- Morley experiment, Einsteins postulates. Lorentz transformation equations. Length contraction & Time dilation, Addition of velocities; Variation of mass with velocity Mass energy equivalence.                                                                 06 Hrs.

### Unit -  II

### Optics:

**Interference:** Interference of light, Biprism  experiment, displacement of fringes, Interference in thin  films- wedge  shaped film, Newton's rings,

 **Diffraction**   - Single, Double  & N- Slit, Diffraction grating, Grating spectra, Rayleigh's criterion and resolving power of grating.                                                                 10 Hrs.

### Unit -  III

**Polarization**- Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical  polarized light, Fresnel's theory of optical activity, Polarimeters .

**Laser:**   Spontaneous  and  stimulated  emission  of  radiation, Einstein's Coefficients, construction and working of Ruby, He-Ne lasers and laser applications.                                     08 Hrs.

### Unit – IV

### Fiber Optics and Holography

Fundamental ideas about optical fiber, Types of fibers, Acceptance angle and cone, Numerical aperture, Propagation mechanism and communication in optical fiber. Attenuation, Signal loss in optical fiber and dispersion.

Basic Principle of Holography, Construction and reconstruction of Image on hologram    and applications of holography.                                                                 06 Hrs.

### Reference  Books:

| | | |
|---|---|---|
| (i)    Concepts of Modern Physics | - | Aurthur Beiser (Mc-Graw Hill) |
| (ii)   Introduction to Special theory of Relativity | - | Robert Resnick    - Wiely |
| (iii)  Optics | - | Ajoy Ghatak (TMH) |
| | | Brijlal & Subramanian (S. Chand ) |
| (iv)  Optical Fibre & Laser | - | Anuradha De. ( New Age ) |
| (v)   Fundamental of Physics | - | Resnick, Halliday & Walker (Wiely ) |
| (vi)  Principles of Physics | - | R.A. Serway & J.W. Jewett |
| | | (Thomson Asia Pvt. Ltd.) |

## EAS102/EAS202 : ENGINEERING CHEMISTRY

**L T P**
**3 1 0**

### UNIT-I : CHEMICAL BONDING AND STATES OF MATTER

M.O. theory and its applications in diatonic molecules. Hydrogen bond, metallic bond and their applications. Various states of matter including liquid crystallite state, classification and applications of liquid crystals. Types of unit cell, space lattice (only cubes, Bragg's Law. Calculation and density of the unit cell, one and two dimensional solids such as graphite and its conduction properties. Fullerenes and their applications.

### UNIT-II: REACTION KINETICS, PHASE RULE AND ELECTROCHEMISTRY

Order and molecularity of reactions, Zero order, first order and second order reactions. Integrated rate equations. Theories of reaction rates. Phase rule and its applications to one component system (water). Equilibrium potential, electrochemical cells, galvanic and concentration cells, electrochemical theory of corrosion and protection of corrosion. Fuel cells.

### UNIT-III : STRUCTURAL AND MECHANISTIC CONCEPTS OF ORGANICS

Inductive, electromeric mesomeric and hyperconjugative effects. Stability of reaction intermediates e.g. carbocation and free radicals. Mechanism of nucleophilic substitutions. Mechanism of the following reactions:

(i)     Aldol condensation

(ii)    Cannizaro reaction

(iii)   Beckman rearrangement

(iv)    Hoffmann rearrangement and

(v)     Diels-Alder reaction.

E-Z nomenclature, R.S. configuration, optical isomerism, chirality and its implications, conformations of butene.

### UNIT-IV : POLYMERS AND ORGANOMETALLICS

Polymerization and its classification. Thermoplastic and Thermosetting resins. Eleastomers and synthetic fibres. Ion exchange resins. Organic conducting and biodegradable polymers. Classification and general methods of synthesis of organics and their applications in polymerizations and catalysis.

### UNIT-V : ANALYTICAL METHODS AND FUELS

Titrimetric analysis with reference to acid-base, redox, precipitations and complexometric titrations. Elementary ideas and simple applications of u.v., visible, infra-red and $^{H}$NMR spectral techniques. Water treatment methods for boiler feed water by calgon process, zeolites and ion-exchange resins. Classification of fuels. Analysis of coal, determination of colorific values. Biomass and biogas.

**Text Books**

1. Advanced Inorganic Chemistry, by Cotton, F.A., Wilkinson G., Murrillo, C.A. and Bochmann, Wiley, ehichester, 1999.

2. March's Advanced Organic Chemistry : Reactions, Mechanisms and Structure Smith, Michael B./March, Jerry, John Willey & sons, 6$^{th}$ Edition, 2007.

3. Elements of Physical Chemistry, Glasstonne, Samuel B. ELBS, 2005.

4. Organic Chemistry, Finar, I.L. : Addision – Wesley Longman, Limited, 2004.

**Reference Books**

1. Text Book of Polymer Science by F.W. Billmeyer, John Wiley & sons, 1994.

2. Liquid Crystals and Plastic Crystals, vol.-I, edited by G.W. Gray and P.A. Winsor, Ellis Harwood Series in Physical Chemistry, New York.

3. Corrosion Engineering by M.G. Fontana McGraw Hill Publications.

**L T P**
3 1 0

**UNIT I**
**Two Dimensional Force Systems:** Basic concepts, Laws of motion, Principle of Transmissibility of forces, Transfer of a force to parallel position , Resultant of a force system, Simplest Resultant of Two dimensional concurrent and Non-concurrent Force systems, Distributed force system, Free body diagrams, Equilibrium and Equations of Equilibrium, Applications.                                            5
**Friction**: Introduction, Laws of Coulomb Friction, Equilibrium of Bodies involving Dry-friction, Belt friction, Application.                                            3

**UNIT II**
**Beam**: Introduction, Shear force and Bending Moment, Differential Equations for Equilibrium, Shear force and Bending Moment Diagrams for Statically Determinate Beams.                          5
**Trusses:** Introduction, Simple Truss and Solution of Simple truss, Method f Joints and Method of Sections.                                            3

**UNIT III**
**Centroid and Moment of Inertia:** Centroid of plane, curve, area, volume and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem, Perpendicular axes theorems, Principal Moment Inertia, Mass Moment of Inertia of Circular Ring, Disc, Cylinder, Sphere and Cone about their Axis of Symmetry.                                            6

**UNIT IV**
**Kinematics of Rigid Body:** Introduction, Plane Motion of Rigid Body, Velocity and Acceleration under Translation and Rotational Motion, Relative Velocity.                                            4
**Kinetics of Rigid Body:** Introduction, Force, Mass and Acceleration, Work and Energy, Impulse and Momentum, D'Alembert's Principles and Dynamic Equilibrium.                                            4

**UNIT V**
**Simple Stress and Strain:** Introduction, Normal and Shear stresses, Stress- Strain Diagrams for ductile and brittle material, Elastic Constants, One Dimensional Loading of members of varying cross-sections, Strain energy.                                            3
**Pure Bending of Beams:** Introduction, Simple Bending Theory, Stress in beams of different cross sections.                                            3
**Torsion:** Introduction, Torsion of shafts of circular section, torque and twist, shear stress due to torque.                                            3

**Text books:**
1.      Engineering Mechanics by Irving H. Shames, Prentice-Hall
2.      Mechanics of Solids by Abdul Mubeen, Pearson Education Asia.
3.      Mechanics of Materials by E.P.Popov, Prentice Hall of India Private Limited.

## EEE101/EEE201 : ELECTRICAL ENGINEERING

**L T P**
**3 1 0**

**Unit-I**

**1.    D C Circuit Analysis and Network Theorems:**

Circuit Concepts: Concepts of network, Active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, R, L and C as linear elements, source transformation.

Kirchhoff's laws; loop and nodal methods of analysis; star-delta transformation; Network Theorems: Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem (simple numerical problems).                                                                                    9

**Unit-II**

**2.    Steady- State Analysis of Single Phase AC Circuits:**

AC Fundamentals: Sinusoidal, square and triangular waveforms – average and effective values, form and peak factors, concept of phasors, phasor representation of sinusoidally varying voltage and current. Analysis of series, parallel and series-parallel RLC Circuits: apparent, active & reactive powers, power factor, causes and problems of low powerfactor, powerfactor improvement; resonance in series and parallel circuits, bandwidth and quality factor (simple numerical problems).                                                          8

**Unit-III**

**3.    Three Phase AC Circuits:**

Three phase system-its necessity and advantages, meaning of phase sequence, star and delta connections, balanced supply and balanced load, line and phase voltage/current relations, three-phase power and its measurement (simple numerical problems).                                                                   3

**4.    Measuring Instruments:**

Types of instruments, construction and working principles of PMMC and moving iron type voltmeters & ammeters, single phase dynamometer wattmeter and induction type energy meter, use of shunts and multipliers (simple numerical problems on energy meter, shunts and multipliers).                   4

**Unit-IV**

**5.    Introduction to Power System:**

General layout of electrical power system and functions of its elements, standard transmission and distribution voltages, concept of grid (elementary treatment only).                                          2

**6.    Magnetic Circuit:**

Magnetic circuit concepts, analogy between electric & magnetic circuits, magnetic circuits with DC and AC excitations, magnetic leakage, B-H curve, hysteresis and eddy current losses, magnetic circuit calculations, mutual coupling. 3

**7.     Single Phase Transformer:**

Principle of operation, construction, e .m. f. equation, equivalent circuit, power losses, efficiency (simple numerical problems), introduction to auto transformer. 3

**Unit-V**
**8.  Electrical Machines:**
Principles of electro mechanical energy conversion,

**DC machines:** types, e. m. f. equation of generator and torque equation of motor, characteristics and applications of dc motors (simple numerical problems).

**Three Phase Induction Motor:**   types, Principle of operation, slip-torque characteristics, applications (numerical problems related to slip only).

**Single Phase Induction motor:** Principle of operation and introduction to methods of starting, applications.

**Three Phase Synchronous Machines:** Principle of operation of alternator and synchronous motor and their applications. 8

**Text Books:**
1.  V. Del Toro, " Principles of Electrical Engineering" Prentice Hall International
2.  I.J. Nagarath, " Basic Electrical Engineering" Tata McGraw Hill
3.  D.E. Fitzgerald & A. Grabel Higginbotham, " Basic Electrical Engineering  Mc- Graw Hill

**Reference Books:**
1.  Edward Hughes, " Electrical Technology" Longman
2.  T.K. Nagsarkar & M.S. Sukhija, " Basic Electrical Engineering" Oxford University Press.
3.  H. Cotton, " Advanced Electrical Technology" Wheeler Publishing
4.  W.H. Hayt & J.E. Kennely, " Engineering Circuit Analysis" Mc Graw Hill.

**L  T  P**
**3  1  0**

## UNIT 1:

Introduction to any Operating System [Unix, Linux, Windows], Programming Environment, Write and Execute the first program, Introduction to the Digital Computer; Concept of an algorithm; termination and correctness. Algorithms to programs: specification, top-down development and stepwise refinement. Introduction to Programming, Use of high level programming language for the systematic development of programs. Introduction to the design and implementation of correct, efficient and maintainable programs, Structured Programming, Trace an algorithm to depict the logic, Number Systems and conversion methods

## UNIT 2:

Standard I/O in "C",  **Fundamental Data Types and Storage Classes:** Character types, Integer, short, long, unsigned, single and double-precision floating point, storage classes, automatic, register, static and external, **Operators and Expressions:** Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associativity,

## UNIT 3:

**Conditional Program Execution:** Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch, **Program Loops and Iteration:** Uses of while, do and for loops, multiple loop variables, assignment operators, using break and continue, **Modular Programming:** Passing arguments by value, scope rules and global variables, separate compilation, and linkage, building your own modules.

## UNIT 4:

**Arrays:** Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size, **Structures:** Purpose and usage of structures, declaring structures, assigning of structures, **Pointers to Objects:** Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments, Dynamic memory allocation, defining and using stacks and linked lists.

## UNIT 5:

Sequential search, Sorting arrays, Strings, Text files, **The Standard C Preprocessor:** Defining and calling macros, utilizing conditional compilation, passing values to the compiler, **The Standard C Library:** Input/Output : fopen, fread, etc, string handling functions, Math functions : log, sin, alike  Other Standard C functions.

### Lecture-wise Break-UP

| Week | Lecture 1 | Lecture 2 | Lecture 3 | Lab Meeting |
|------|-----------|-----------|-----------|-------------|
| Week-1 | Introduction to any OS, Programming Environment | A Simple C program | Need of Datastructures & Algorithms | Get familiar with OS and Environment. |
| Week-2 | An Example, Termination, Correctness | Different Types of Programming Languages | Number Systems | Get familiar with C compiler Implement and Test Small |

| | | | | Routine in C |
|---|---|---|---|---|
| Week-3 | Number Systems | Standard I/O in C | Data Types and Variables | Implement and Test Small Routine in C |
| Week-4 | Data Types and Variable | Data Types and Variable | Operators & Expression | Evaluation of Expression |
| Week-5 | Operators & Expression | Operators & Expression | Operators & Expression | Evaluation of Expression |
| Week-6 | IF, SWITCH Statements | IF, SWITCH Statements | Nested If Statement | Iteration |
| Week-7 | Repetition structure in C | Repetition structure in C | Modular Programming | Iteration, Function |
| Week-8 | Modular Programming | Modular Programming | Arrays | Recursion, Function |
| Week-9 | Arrays | Structures | Structures | Arrays, Structures |
| Week-10 | Pointers | Pointers | Pointers | Linked Lists |
| Week-11 | Searching | Selection | Sorting | Searching, Selection |
| Week-12 | Sorting | Strings | Strings | Sorting, Strings |
| Week-13 | Files | Files | Std C Preprocessor | Files |
| Week-14 | Std C Library | Std C Library | Std C Library | Use of Std. C Library |

**Text Books :**
1. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
2. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition [India Edition], 2007.

# EEC-101/EEC-201 : ELECTRONICS ENGINEERING

**L T P**
**3 1 0**

**Unit – I**            (10 pds)
**Semiconductor Diodes and Applications:**

| | |
|---|---|
| p-n junction, depletion layer | 1 |
| v-i characteristics, ideal and practical, diode resistance, capacitance | 1 |
| diode ratings (average current, repetitive peak current, peak-inverse voltage) | 1 |
| p-n junction as rectifiers (half wave and full wave) | 1 |
| filter (Shunt capacitor filter), calculation of ripple factor and load regulation | 2 |
| clippling circuits, clamping circuits, voltage multipliers | 1 |

**Breakdown diodes:**

| | |
|---|---|
| breakdown mechanism (zener and avalanche) | 1 |
| breakdown characteristics, zener resistance, zener diode ratings | 1 |
| zener diode application as shunt regulator | 1 |

**Unit – II**            (08 pds)
**Bipolar Junction Transistor (BJT):**

| | |
|---|---|
| basic construction, transistor action | 1 |
| CB, CE and CC configurations, input/ output characteristics | 1 |
| biasing of transistors, fixed bias, emitter bias, potential divider bias, comparison of biasing circuits | 2 |
| graphical analysis of CE amplifier, concept of voltage gain, current gain, h-parameter model (low freq.) | 2 |
| computation of Ai, Av, Ri, Ro of single transistor CE amplifier configuration | 2 |

**Unit – III**            (10 pds)
**Field Effect Transistor (FET):**

| | |
|---|---|
| JFET: Basic construction, principle of working, concept of pinch-off | 1 |
| maximum drain saturation current, input and transfer characteristics | 1 |
| characteristic equation, CG, CS and CD configurations, fixed and self biasing of JFET amplifier | 2 |
| MOSFET: depletion and enhancement type MOSFET- construction, operation and characteristics | 2 |

**Operational Amplifier (Op-Amp):**

| | |
|---|---|
| concept of ideal operational amplifier, ideal and practical Op-Amp parameters | 1 |
| inverting, non-inverting and unity gain configurations | 1 |
| applications of Op-Amp as adders, difference amplifiers, integrators and differentiator | 2 |

**Unit – IV**            (07 pds)
**Switching Theory and Logic Design (STLD):**

| | |
|---|---|
| number system, conversion of bases (decimal, binary, octal and hexadecimal numbers) | 2 |
| addition and subtraction, fractional numbers, BCD numbers | 1 |
| Boolean algebra, logic gates, concept of universal gates | 2 |
| canonical forms, minimization using K-map (don't care conditions also) | 2 |

**Unit – V**            (05 pds)
**Electronics Instruments:**

| | |
|---|---|
| working principle of digital voltmeter, digital multimeter (block diagram approach) | 2 |
| CRO (its working with block diagram) | 1 |
| measurement of voltage, current, phase and frequency using CRO | 2 |

**Books and references:**

1. Robert L. Boylestad/ Louis Nashelsky "Electronic Devices and Circuit Theory", 9th Edition, Pearson Education 2007
2. Devid A. Bell "Electronic Devices and Circuits", 5th Edition, OXFORD University Press 2008
3. Jacob Millman/ Christos C. Halkias/ Satyabrata Jit "Electronics Devices and Circuits", 3rd Edition, TMH 2008
4. Morris Mano "Digital Computer Design", PHI 2003
5. H.S. Kalsi "Electronic Instrumentation", 2nd Edition, TMH 2007

## EAS-104/EAS-204 : PROFESSIONAL COMMUNICATION

**L T P**
**3 1 0**

### Unit -1 Basics of Technical Communication

Technical Communication: features; Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communication; The flow of Communication: Downward, Upward, Lateral or Horizontal (Peer group); Importance of technical communication;     Barriers to Communication.                                                                5

### Unit - II Constituents of Technical Written Communication

Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; Requisites of Sentence Construction: Paragraph Development: Techniques and Methods - Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation- various steps.        8

### Unit - III Forms of Technical Communication

Business Letters: Sales and Credit letters; Letter of Enquiry; Letter of Quotation, Order,

Claim and Adjustment Letters; Job application and Resumes.

Official Letters: D.O. Letters; Govt. Letters, Letters to Authorities etc.

Reports: Types; Significance; Structure, Style & Writing of Reports.

Technical Proposal; Parts; Types; Writing of Proposal; Significance.

Technical Paper, Project. Dissertation and Thesis Writing: Features, Methods & Writing.                10

### Unit - IV Presentation Strategies

Defining Purpose; Audience & Locale; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Space; Setting Nuances of Voice Dynamics; Time- Dimension.                7

### Unit - V Value- Based Text Readings

Following essays form the suggested text book  with emphasis on Mechanics of writing,

(i)      The Aims of Science and the Humanities by M.E. Prior

(ii)     The Language of Literature and Science by A.Huxley

(iii)    Man and Nature by J.Bronowski

(iv)     The Mother of the Sciences by A.J.Bahm

(v)      Science and Survival by Barry Commoner

(vi)     Humanistic and Scientific Approaches to Human Activity by Moody E. Prior

(vii)    The Effect of Scientific Temper on Man by Bertrand Russell.                                10


### Text Book

1.      Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, New Delhi .

2.      Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press 2007, New Delhi.

**Reference Books**

1.      Effective Technical Communication by Barun K. Mitra, Oxford Univ. Press, 2006, New Delhi

2.      Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., New Delhi.

3.      How to Build Better Vocabulary by M.Rosen Blum, Bloomsbury Pub. London.

4.      Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors; Delhi.

5.      Developing Communication Skills by Krishna Mohan, Meera Banerji- Macmillan India Ltd. Delhi.

6.      Manual of Practical Communication by L.U.B. Pandey & R.P. Singh; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, Delhi.

# EME-101/EME-201 :  MANUFACTURING PROCESSES

**L  T  P**
**2  0  0**

## Unit-I    Basic Metals & Alloys : Properties and Applications

**Properties of Materials:**  Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness and hardness. Elementary ideas of fracture, fatigue & creep.                                                        **2**
**Ferrous Materials:**  Carbon steels, its classification based on % carbon as low, mild, medium & high carbon steel, its properties & applications. Wrought iron. Cast iron. Alloy steels: stainless steel, tool steel.   Elementary introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching & tempering and case-hardening.                                                                                                                                   **3**
**Non-Ferrous   metals   &   alloys:**  Common   uses   of   various   non-ferrous   metals   & alloys and its composition  such as  Cu-alloys: Brass, Bronze,  Al-alloys such as Duralumin.            **2**

## Unit-II   Introduction to Metal Forming & Casting Process and its applications

**Metal Forming:**  Basic metal forming operations & uses of such as : Forging , Rolling  , Wire & Tube-drawing/making and Extrusion, and its products/applications.  Press-work, &  die & punch assembly, cutting and forming, its applications.  Hot-working versus cold-working.                                             **4**
**Casting:**  Pattern & allowances. Molding sands and its desirable properties. Mould making with the use of a core. Gating system. Casting defects & remedies. Cupola Furnace. Die-casting  and its uses.            **3**

## Unit-III   Introduction to Machining & Welding and its applications

**Machining:**    Basic    principles    of    Lathe-machine    and    operations    performed    on    it. Basic description  of machines and operations of  Shaper-Planer, Drilling, Milling & Grinding.           **4**
**Welding:**  Importance & basic concepts of welding, classification of welding processes. Gas-welding, types of flames. Electric-Arc welding. Resistance welding. Soldering & Brazing and its uses.                           **3**

## Unit-IV    Misc. Topics

**Manufacturing:**     Importance   of   Materials   &   Manufacturing   towards   Technological   &   Socio-Economic developments.  Plant location.  Plant layout – its types.  Types of  Production.  Production versus Productivity.                                                                                                                                          **3**
**Non-Metallic Materials:**  Common types & uses of  Wood, Cement-concrete, Ceramics, Rubber, Plastics and Composite-materials.                                                                                                            **2**
**Misc. Processes:**  Powder-metallurgy process & its applications, Plastic-products manufacturing, Galvanizing and  Electroplating.                                                                                                                   **2**

# EAS105/EAS205 : ENVIRONMENT & ECOLOGY

**2 -0 -0**

## UNIT-I

Definition, Scope & Importance, Need For Public Awareness- Environment definition, Eco system – Balanced ecosystem, Human activities – Food, Shelter, Economic and social Security. 3

Effects of human activities on environment-Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development. 3

## UNIT-II

Natural Resources- Water Resources- Availability and Quality aspects. Water borne diseases, Water induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material cycles- Carbon, Nitrogen and Sulphur Cycles. 4

Energy – Different types of energy, Electro-magnetic radiation. Conventional and Non-Conventional sources – Hydro Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Bio-gas. Hydrogen as an alternative future source of Energy. 4

## UNIT-III

Environmental Pollution and their effects. Water pollution, Land pollution. Noise pollution, Public Health aspects, Air Pollution, Solid waste management. 3

**Current Environmental Issues of Importance :** Population Growth, Climate Change and Global warming-Effects, Urbanization, Automobile pollution. 3

Acid Rain, Ozone Layer depletion, Animal Husbandry. 3

## UNIT-IV

Environmental Protection- Role of Government, Legal aspects, Initiatives by Non-governmental Organizations (NGO), Environmental Education, Women Education. 3

**Text Books**

1.     Environmental Studies – Benny Joseph – Tata McgrawHill-2005
2.     Environmental Studies – Dr. D.L. Manjunath, Pearson Education-2006.
3.     Environmental studies – R. Rajagopalan – Oxford Publication - 2005.
4.     Text book of Environmental Science & Technology – M. Anji Reddy – BS Publication..

**Reference Books**
1.     Principles of Environmental Science and Engineering – P. Venugoplan Rao, Prentice Hall of India.
2.     Environmental Science and Engineering – Meenakshi, Prentice Hall India.

**L T P
2 0 0**

**Unit -1 Basic Applied Grammar and Usage**

The Sentences; Kinds of Sentences; Kinds of Phrases; Parts of Speech: Noun: Kinds, Gender; Case; Usage: Rules for Singular Nouns, Nouns in Plural form but Singular in sense etc. Nouns ending in - ics. Nouns ending in - es etc;

Pronoun: Definition, Kinds; Number, Gender, Person, Usage.

Adjectives and Determiners: Kinds, Position; Comparatives and Superlatives,

Conversion of Adjectives as Nouns, as adverbs, as Verbs. Determiners- Kinds. Usage of Adjectives and Determiners.

Articles: Kinds, Articles and Number System, Articles and Gender System, Omission of Articles, Repetition of Articles.

Adverbs: Kinds; Formation, Position of Adverbs, Degree of Comparison, Usage.

Preposition: Kinds, Prepositions and Adverbial Participles, Position; correct Usage, Meaning & Usage.

Verbs: Kinds; Auxiliaries; Principal Auxiliaries: Usage; Be, Have, Do, Modal

auxiliaries: Usage- Can/Could, May/Might; Must; Shall/Should; Will/Would; Ought to, Semi-Modals- Need; Dare; Used to.

Non-Finite Verbs: Kinds of Non-Finite: Infinitives, Gerund; Participle.

Concord: Of Numbers, Of Person. Exceptions to Grammatical; Concord; Concord System.

Conjunction: Coordinating Conjunction; Subordinating Conjunction.

Interjection: Definition, Types.

Mood: Indicative, Imperative, Subjunctive.

Active and Passive Voice.

Conditional Sentences.                                                                                                     10

**Unit - II The Structure of Sentences/Clauses**

Adverb Clause; Adjective Clause; Noun Clause. Sentences: Simple, Double, Multiple and Complex. Transformation of Sentences:

Simple to complex and vice versa; Transformation of Degree; Simple to Compound and vice versa; Interrogative into Assertive; Affirmative into Negative and vice versa:

Transformation of Statement into Exclamation. Sequence of Tenses: Usage.                                8

## Unit - III Paragraph Writing

Structure of Paragraph; Construction of Paragraph; Techniques of Paragraph Writing, Unity; Coherence; Emphasis. Expansion: Definition, Method of Expansion; Making of Expansion. Paraphrasing : Use of Paraphrasing; Exercises. 5

## Unit - IV Comprehension & Precis Writing

Role of Listening; Ear Training, Reading Comprehension; Reasons for poor Comprehension; Improving Comprehension Skills; Developing Skills of Comprehension; Exercises. Precis Writing: Difference from Comprehension; Techniques of Precis Writing; Topic Sentences and its Arrangement.

## Short Essay Writing

Definition of Essay; Types of Essay, Relevant Essay Writing for Engineers/Professionals; Use of Essay Writing,

Dimensions of Essay Writing : Literary, Scientific, Sociological: Contemporary

Problem Solving Essays.

Horizons of Essay Writing: Narrative Essays; Descriptive Essays; Reflective Essays;

Expository Essays; Argumentative and Imaginative Essays. Exercise. 5

## Text Book

1. A Remedial Course in English for Colleges  Books 1-3 by B.K. Das & A. David, Oxford Univ. Press, New Delhi.

## Reference Books

1. Current English Grammar and Usage with composition by R.P. Sinha, Oxford Univ. Press, New Delhi.
2. English Grammar, Composition and Usage by J.C. Nesfield, Macmillan India Ltd. Delhi.
3. Oxford Practice Grammar by John Eastwood, Oxford Univ. Press, New Delhi.
4. Fowler's Modem English Usage by R.W. Burchfield, O.U.P. New Delhi.
5. English Grammar & Composition by P.C. Wren & Martin, S. Chand & Co. Ltd., New Delhi.

## EAS152/EAS-252 : ENGINEERING CHEMISTRY (PARACTICALS)

**List of Experiments**

1. Determination of alkalinity in the given water sample.

2. Determination of temporary and permanent hardness in water sample using EDTA as standard solution.

3. Determination of available chlorine in bleaching powder.

4. Determination of chloride content in bleaching powder.

5. Determination of iron content in the given water sample by Mohr's methods.

6. pH-metric titration.

7. Determination of Equivalent weight of iron by the chemical displacement method. The equivalent weight of copper is 63.5.

8. Viscosity of an addition polymer like polyester by Viscometer.

9. Determination of iron concentration in sample of water by colorimetric method. The method involves the use of KSCN as a colour developing agent and the measurements are carried out at $\lambda_{max}$ 480nm.

10. Element detection and functional group identification in organic compounds.

11. Preparation of Bakelite resin.

## EME-152/252 : ENGINEERING MECHANICS LAB.

**L T P**
0  0  2

(Any  10 experiments of the following or such experiments suitably designed)

1. To conduct the tensile test and determine the ultimate tensile strength, percentage elongation for a steel specimen.
2. To determine the compression test and determine the ultimate compressive strength for a specimen
3. To conduct the Impact-tests (Izod / Charpy) on Impact-testing machine to find the toughness.
4. To determine the hardness of the given specimen using Vicker/Brinell/Rockwell hardness testing machine..
5. To study the slider-crank mechanism etc. of 2-stroke & 4-stroke  I.C. Engine models.
6.  Friction experiment(s) on inclined plane and/or on screw-jack.
7.  Simple & compound gear-train experiment.
8.  Worm & worm-wheel experiment for load lifting.
9.  Belt-Pulley experiment.
10. Bending of simply-supported and cantilever beams  for theoretical & experimental deflection.
11. Torsion of rod/wire experiment.
12. Experiment on Trusses.
13. Statics experiment on equilibrium
14. Dynamics experiment on momentum conservation
15. Dynamics experiment on collision  for determining coefficient of restitution.
16. Experiment on Moment of Inertia.

# EEE151/EEE251 : ELECTRICAL ENGINEERING LABORATORY

**L T P**
**0 0 2**

**List of Experiments**

**Note : A minimum of 10 experiments from the following should be performed**

1. Verification of Kirchhoff's laws

2. Verification of (i) Superposition theorem (ii) Thevenin's Theorem (iii) Maximum Power Transfer Theorem.

3. Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor

4. Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.

5. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor.

6. Determination of parameters of ac single phase series RLC circuit

7. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer

8. To study speed control of dc shunt motor using (i) armature voltage control (ii) field flux control.

9. Determination of efficiency of a dc shunt motor by load test

10. To study running and speed reversal of a three phase induction motor and record speed in both directions.

11. To measure energy by a single phase energy meter and determine error.

12. To study P-N diode characteristics

13. To study full wave and half wave rectifier circuits with and without capacitor and determine ripple factors.

14. To study various logic gates (TTL)

15. To study Operational Amplifier as Adder and Subtractor

16. To study transistor as a switch.

# ECS 151/ECS 251 : COMPUTER PROGRAMMING LAB

**L T P**
**0 0 2**

Suggested Assignments to be conducted on a 3-hour slot. It will be conducted in tandem with the theory course so the topics for problems given in the lab are already initiated in the theory class. The topics taught in the theory course should be appropriately be sequenced for synchronization with the laboratory. A sample sequence of topics and lab classes for the topic are given below:

1. Familiarization of a computer and the environment and execution of sample programs
2. Expression evaluation
3. Conditionals and branching
4. Iteration
5. Functions
6. Recursion
7. Arrays
8. Structures
9. Linked lists
10. Data structures

| Week | Lecture 1 | Lecture 2 | Lecture 3 | Lab Meeting |
|------|-----------|-----------|-----------|-------------|
| Week-1 | Introduction to any OS, Programming Environment | A Simple C program | Need of Datastructures & Algorithms | Get familiar with OS and Environment. |
| Week-2 | An Example, Termination, Correctness | Different Types of Programming Languages | Number Systems | Get familiar with C compiler Implement and Test Small Routine in C |
| Week-3 | Number Systems | Standard I/O in C | Data Types and Variables | Implement and Test Small Routine in C |
| Week-4 | Data Types and Variable | Data Types and Variable | Operators & Expression | Evaluation of Expression |
| Week-5 | Operators & Expression | Operators & Expression | Operators & Expression | Evaluation of Expression |
| Week-6 | IF, SWITCH Statements | IF, SWITCH Statements | Nested If Statement | Iteration |
| Week-7 | Repetition structure in C | Repetition structure in C | Modular Programming | Iteration, Function |
| Week-8 | Modular Programming | Modular Programming | Arrays | Recursion, Function |
| Week-9 | Arrays | Structures | Structures | Arrays, Structures |
| Week-10 | Pointers | Pointers | Pointers | Linked Lists |
| Week-11 | Searching | Selection | Sorting | Searching, Selection |
| Week-12 | Sorting | Strings | Strings | Sorting, Strings |
| Week-13 | Files | Files | Std C Preprocessor | Files |
| Week-14 | Std C Library | Std C Library | Std C Library | Use of Std. C Library |

It is suggested that some problems related to continuous domain problems in engineering and their numerical solutions are given as laboratory assignments. It may be noted that some of basic numerical methods are taught in the Mathematics course.

# EWS-151/251 : WORKSHOP PRACTICE

**L T P**
**0 1 3**

1. **Carpentry Shop:** 1. Study of tools & operations and carpentry joints. 2. Simple exercise using jack plane.
3. To prepare half-lap corner joint, mortise & tennon joints. 4. Simple exercise on woodworking lathe.

2. **Fitting Bench Working Shop:** 1. Study of tools & operations 2. Simple exercises involving fitting work.
3. Make perfect male-female joint. 4. Simple exercises involving drilling/tapping/dieing.

3. **Black Smithy Shop:** 1. Study of tools & operations 2. Simple exercises base on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging.

4. **Welding Shop:** 1.Study of tools & operations of Gas welding & Arc welding 2. Simple butt  and Lap welded joints. 3. Oxy-acetylene flame cutting.

5. **Sheet-metal Shop:** 1. Study of tools & operations. 2. Making Funnel complete with 'soldering'.
3. Fabrication of tool-box, tray, electric panel box etc.

6. **Machine Shop:** 1. Study of machine tools and operations. 2. Plane turning. 3. Step turning 4. Taper turning. 5. Threading 6. Single point cutting tool grinding.

7. **Foundry Shop:** 1. Study of tools & operations 2. Pattern making. 3. Mould making with the use of a core.
4. Casting

# ECE-151/251 : COMPUTER AIDED ENGINEERING GRAPHICS

**L  T  P**
**0  1  3**

## Unit-I

### 1. Introduction to Computer Aided Sketching

Introduction, Drawing Instruments and their uses, BIS conventions, lettering Dimensioning and free hand practicing.

Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Coordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line convention, material conventions and lettering.                    **2-Sheet**

### 2. Orthographic Projections

Introduction, Definitions- Planes of projection, reference line and conventions  employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems).       **2-Sheet**

### 3. Orthographic Projections of Plane Surfaces
####    (First Angle Projection Only)

Introduction, Definitions-projections of plane surfaces-triangle, square rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates.)                                                                                1**-Sheet**

### 4. Projections of Solids (First Angle Projection Only)

Introduction, Definitions- Projections of right regular- tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions. (No problems on octahedrons and combination solid)       **2-Sheet**

### 5. Sections and Development of Lateral Surfaces of Solids

Introduction, Section planes, Sections, section  views, Sectional views, apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on section of solids)                                                                                **1-Sheet**

Development of lateral surface of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, Tetrahedrons spheres and transition pieces).

### 6. Isometric Projection (Using Isometric Scale Only)

Introduction, Isometric scale, Isometric Projection of simple plane figures, Isometric Projection of tetrahedron, hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three Solids).                                                         **1-Sheet**

**Note : At least 3 drawing assignments must be on AUTOCAD.**

**Text Book**

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48$^{th}$ edition, 2005 Charotar Publishing House, Gujarat.
2. A Primer on Computer Aided Engineering Drawing-2006, Published by VTU, Belgaum.

**Reference Book**

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3$^{rd}$ revised edition-2006.
2. Engineering Graphics – K.R. Gopalakrishna, 32$^{nd}$ edition, 2005 – Subash Publishers Bangalore.
3. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production – Luzadder Warren J., duff John M., Eastern Economy Edition, 2005 – Prentice-Hall of India Pvt. Ltd., New Delhi.

# EAS-151/EAS-251 : PHYSICS LAB

**L T P**

**0 0 2**

## List of Experiments

**Any ten experiments, at least four from each group.**

### Group -A

1. To determine the wavelength of monochromatic light by Newton's ring.

2. To determine the wavelength of monochromatic light with the help of Fresnel's biprism.

3. To determine the focal length of two lenses by nodal slide and locate the position of cardinal points.

4. To determine the specific rotation of cane sugar solution using polarimeter.

5. To determine the wavelength of spectral lines using plane transmission grating.

6. To study the polarization of light by simple reflection using laser.

7. Measurement of Wavelength of a laser (He- Ne) light using single slit diffraction.

### Group – B

8. To determine the specific resistance of a given wire using Carey Foster's bridge.

9. To study the variation of magnetic field along the axis of current carrying -
   Circular coil and then to estimate the radius of the coil.

10. To verify Stefan's Law by electrical method.

11. To calibrate the given ammeter and voltmeter by potentiometer.

12. To study the Hall effect and determine Hall coefficient, carrier density and - mobility of a given semiconductor using Hall effect set up.

13. To determine the energy band gap of a given semiconductor material.

14 To determine E.C.E. of copper using Tangent or Helmholtz galvanometer.

15. To draw hysteresis curve of a given sample of ferromagnetic material and from - this to determine magnetic susceptibility and permeability of the given specimen.

16. To determine the ballistic constant of a ballistic galvanometer.

17. To determine the coefficient of viscosity of a liquid.

18. Measurement of fiber attenuation and aperture of fiber.

19. High resistance by leakage method.

20. Magnetic Susceptibility of paramagnetic solution.

**EAS-154/EAS-254 : PROFESSIONL COMMUNICATION LABORATORY**

**L  T  P**
**0  0  2**

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication based on International Phonetic Alphabets (I.P.A.)

## LIST OF PRACTICALS

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.
2. Conversational Skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.
3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistics/Kinesics.
4. Presentation Skills for Technical Paper/Project Reports/ Professional Reports based on proper Stress and Intonation Mechanics.
5. Official/Public Speaking based on suitable Rhythmic Patterns.
6. Theme- Presentation/ Key-Note Presentation based on correct argumentation methodologies.
7. Individual Speech Delivery/Conferences with skills to defend Interjections/Quizzes.
8. Argumentative Skills/Role Play Presentation with Stress and Intonation.
9. Comprehension Skills based on Reading and Listening Practicals on a model Audio-Visual Usage.

## Reference Books

1. Bansal R.K. & Harrison: Phonetics in English, Orient Longman, New Delhi.
2. Sethi & Dhamija: A Course in Phonetics and Spoken English, Prentice Hall, New Delhi.
3. L.U.B.Pandey & R.P.Singh, A Manual of Practical Communication, A.I.T.B.S. Pub. India Ltd. Krishan Nagar, Delhi.
4. Joans Daniel, English Pronouncing Dictionary, Cambridge Univ. Press.

# EAS-203 - MATHEMATICS –II

|   | L | T | P |
|---|---|---|---|
|   | 3 | 1 | 0 |

**Unit - I : Differential Equations**

Linear differential equations of nth order with constant coefficients, Complementary functions and particular integrals, Simultaneous linear differential equations, Solution of second order differential equation by changing dependent and independent variables, Method of variation of parameters, Applications to engineering problems (without derivation).

**Unit – II : Series Solution and Special Functions**

Series solution of ordinary differential equations of $2^{nd}$ order with variable coefficients (Frobenius Method), Bessel and Legendre equations and their series solutions, Properties of Bessel functions and Legendre polynomials.

**Unit – III : Laplace Transform**

Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step function , Dirac delta function, Laplace transform of periodic functions, Convolution theorem, Application to solve simple linear and simultaneous differential equations.

**Unit – IV : Fourier Series and Partial Differential Equations**

Periodic functions, Trignometric series, Fourier series of period $2\pi$ , Eulers formulae, Functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series, Harmonic analysis.

Solution of first order Lagrange's linear partial differential equatins, Linear partial differential equations with constant coefficients of $2^{nd}$ order and their classifications - parabolic, elliptic and hyperbolic with illustrative examples.

**Unit – V : Applications of Partial Differential Equations**

Method of separation of variables for solving partial differential equations, Wave equation up to two-dimensions, Laplace equation in two-dimensions, Heat conduction equations up to two-dimensions, Equations of transmission lines.

**Test Books:-**
1. B.V.Ramana, Higher Engineering Mathmatics, Tata Mc Graw-Hill Publishing Company Ltd., 2008.
2. R.K.Jain & S.R.K.Iyenger, Advance Engineering Mathematics, Narosa Publishing House, 2002.

**Reference Books:-**
1. B.S.Grewal, Engineering Mathematics, Khanna Publishers, 2004.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
3. E.Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
4. C.Ray Wylie & Louis C. Barrett, Advanced Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd. 2003
5. Peter V. O'Neil, Advanced Engineering Mathematics, Thomson (Cengage) Learning, 2007.
6. G.F.Simmons, Differential Euations, Tata Mc Graw-Hill Publishing Company Ltd. 1981.
7. Chandrika Prasad, Advanced Mathematic for Engineers, Prasad Mudranalaya,1996.

**L T P**
**2 1 0**

## Unit - I

## Wave Mechanics and X-ray Diffraction

Wave- particle duality, de-Broglie matter waves, Phase and Group velocities, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications, Wave function and its significance, Schrödinger's wave equation – particle in one dimensional box.

Diffraction of X-rays by crystal planes, Bragg's spectrometer, Compton's effect. 10 Hrs.

## Unit – II

## Dielectric and Magnetic Properties of Materials:

Dielectric constant and Polarization of dielectric materials, Types of Polarization (Polarizability) . Equation of internal fields in liquid and solid ( One- Dimensional), Claussius Mussoti- Equation, Ferro and Piezo electricity (Qualitative), Frequency dependence of dielectric constant, Dielectric Losses, Important applications of dielectric material, Langevin's theory for dia and paramagnetic material, Phenomena of hysteresis and its applications.

**Ultrasonic:** Generation, detection and application of ultrasonics 08 Hrs.

## Unit-III

## Electromagnetics

Displacement Current, Maxwell's Equations ( Integral and Differential Forms). Equation of continuity, EM-Wave equation and its propagation characteristics in free space and in conducting media, Poynting theorem and Poynting vectors. 06 Hrs.

## Unit-IV

## Superconductivity and Science and Technology of Nanomaterials:

Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect ), Type I and Type II superconductors, Temperature dependence of critical field, BCS theory (Qualitative), High temperature superconductors. Characteristics of superconductors in superconducting state, Applications of Super-conductors.

Introduction to Nanomaterials- Basic principle of nanoscience and technology, creation and use of buckyballs, structure, properties and uses of Carbon nanotubes, Applications of nanotechnology. 06 Hrs.

## Reference books:

1- Concept of Modern Physics - by Beiser (Tata Mc-Graw Hill)
2- Solid State Physics - by C. Kittel, 7th edition (Wiley Eastern)
3- Materials Science and Engineering - by V. Raghavan (Prentice- Hall India)
4- Solid State Physics - by S.O. Pillai, 5th edition (New Age International )
5- Nanotechnology - by Rechard Booker and Earl Boysen (Wiley Publishing )
6- Introduction to Electrodynamics - by David J. Griffith (PH I)