

# ANNA UNIVERSITY TIRUCHIRAPPALLI

Tiruchirappalli – 620 024

Regulations 2007

Curriculum

Common to all B.E. / B.Tech.  
(Except B.E. Marine Engineering)

## SEMESTER I

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>HS1101</b>	Technical English I	4	0	0	100
2	<b>MA1101</b>	Mathematics I	4	1	0	100
3	<b>HS1102</b>	Engineering Physics I	4	0	0	100
4	<b>HS1103</b>	Engineering Chemistry I	4	0	0	100
5	<b>CS1101</b>	Digital Computer Fundamentals	4	1	0	100
6	<b>ME1101</b>	Engineering Graphics	2	4	0	100
<b>Practical</b>						
7	<b>HS1104</b>	Physics & Chemistry Laboratory I	0	0	4	100
8	<b>GE1101</b>	Engineering Practice	0	0	3	100

## SEMESTER II

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>HS1151</b>	Technical English II	4	0	0	100
2	<b>MA1151</b>	Mathematics II	4	1	0	100
3	<b>HS1152</b>	Engineering Physics II	4	0	0	100
4	<b>HS1153</b>	Engineering Chemistry II	4	0	0	100
5	<b>CE1151</b>	Engineering Mechanics	4	0	0	100
6	<b>GE1151</b>	Basic Engineering	3	0	0	100
<b>Practical</b>						
7	<b>HS1154</b>	Physics & Chemistry Laboratory II	0	0	4	100
8	<b>CS1151</b>	Computer Laboratory	1	0	3	100
9	<b>ME1151</b>	Engineering Drawing Laboratory	0	0	3	100

# ANNA UNIVERSITY TIRUCHIRAPPALLI

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Curriculum

SEMESTER I

Common to all B.E. / B.Tech.

(Except B.E. Marine Engineering)

HS1101 TECHNICAL ENGLISH I

L T P  
4 0 0

**UNIT I FOCUS ON LANGUAGE 10**

Word Formation with Prefixes and Suffixes – Synonyms and Antonyms – Noun Phrases - Infinitive and Gerund – Subject-Verb Agreement – Tenses – Impersonal Passive – Conditional Sentences – Adjectives and Degrees of Comparison – Conjunctions and Prepositions.

**UNIT II BASICS OF TECHNICAL COMMUNICATION 8**

Process of Communication – Language as a Tool of Communication – Levels of Communication – The Flow of Communication – Communication Networks – Importance of Technical Communication - Barriers to Communication.

**UNIT III SPEAKING 10**

Types of Listening – Implications of Effective Listening - Presentation Strategies - Analysing Audience and Locale – Organizing Contents – Preparing an Outline – Visual Aids – Understanding Nuances of Delivery – Sample Speech.

**UNIT IV READING 10**

Predicting the Content – Skimming the Text – Understanding the Gist – Identifying the Topic Sentence and its Role in each Paragraph – Scanning – Inferring/ Identifying Lexical and Contextual Meanings – Transfer of Information/ Note-Making – Understanding Discourse Coherence – Sequencing of Sentences.

**UNIT V WRITING 10**

Sentence Construction – Salient Points for Sentence Construction – Paragraph Development – Central Components of a Paragraph – Techniques for Paragraph Development – Kinds of Paragraphs: Analysis, Description, Definition and Comparison and Contrast.

**TOTAL: 48**

**TEXT BOOK**

1. Meenakshi Raman and Sangeetha Sharma, “Technical Communication: Principles and Practice”, Oxford University Press, New Delhi, 2004.

**REFERENCE BOOKS**

1. Andrea J. Rutherford, “Basic Communication Skills for Technology”, Pearson Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.
2. Ashraf Rizvi, “Effective Technical Communication”, Tata McGraw-Hill, New Delhi, 2005.
3. Ramakrishna Rao, “Learning English : A communicative Approach”, Orient Longman, Hyderabad, 2006.
4. William Sanborn Pfeiffer and T.V.S. Padmaja, “Technical Communication: A Practical Approach”, Sixth Edition, Pearson Education, 2007.

**UNIT I MATRICES 10**

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Problem solving using Cayley-Hamilton theorem – Similarity transformation – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Orthogonal reduction to its canonical form.

**UNIT II THREE DIMENSIONAL GEOMETRY (9+2)**

Angle between two lines – Coplanar lines – Shortest distance between skew lines – Equation of a sphere – Plane section of a sphere – Tangent plane – Orthogonal Spheres.

**UNIT- III DIFFERENTIAL CALCULUS (9+2)**

Curvature – Cartesian and Parametric Co-ordinates – Centre and Radius of curvature – Circle of curvature – Envelopes – Evolutes.

**UNIT – IV FUNCTIONS OF SEVERAL VARIABLES (10+2)**

Partial derivatives – Euler’s theorem for homogeneous functions – Total derivative – Differentiation of implicit functions – Jacobians – Maxima / Minima for functions of two variables – Method of Lagrange’s multipliers – Taylor’s expansion.

**UNIT – V ORDINARY DIFFERENTIAL EQUATIONS (ODE) (10+3)**

Solution of second and higher order linear ODE with constant coefficients – Simultaneous first order linear equations with constant coefficients – Linear equations of second order with variable coefficients – Cauchy’s and Legendre’s linear equations – Method of variation of parameter.

$$\mathbf{L + T = 48 + 12 = 60}$$

**TEXT BOOK**

1. Grewal, B.S., “Higher Engineering Mathematics”, Thirty eighth Edition, Khanna Publishers, New Delhi, 2005.

**REFERENCES**

1. Glyn James., “Advanced Modern Engineering Mathematics”, Third Edition, Pearson Education Ltd, New Delhi, 2004.
2. Venkataraman. M. K., “Engineering Mathematics”, Volume I and II Revised enlarged Fourth Edition, The National Publishing Company, Chennai, 2004.
3. Veerarajan. T., “Engineering Mathematics (for first year)”, Fourth Edition, Tata McGraw – Hill Publishing Company Limited, New Delhi, 2005.
4. V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, “Engineering Mathematics”, Fifth Edition, Vikas Publishing house Pvt. Ltd., New Delhi, 2006.

## HS1102 ENGINEERING PHYSICS I

L	T	P
4	0	0

### UNIT – I PROPERTIES OF MATTER AND HYDRODYNAMICS (9)

**Properties of matter:** Stress – Strain – Hooke's Law – Types of moduli of elasticity – Torsional pendulum – Determination of Rigidity modulus of a wire – Bending of beams – Expression for bending moment – Measurement of Young's modulus by uniform and Non-uniform bending.

**Hydrodynamics:** Stream line flow – Turbulent flow – Poiseuille's formula for flow of liquid through a capillary tube – Determination of coefficient of viscosity of a liquid.

### UNIT – II ACOUSTICS AND ULTRASONICS (10)

**Acoustics:** Classification of sound – Characteristics of musical sound – Loudness – Weber-Fechner law – Decibel – Reverberation time – Sabine's formula (Growth and Decay) – Factors affecting acoustics of building (Optimum reverberation time, Loudness, Focusing, Echo, Resonance and Noise, and their remedies) – Measurement of sound absorption coefficient – Sound absorbing materials.

**Ultrasonics:** Properties of ultrasonic waves – Ultrasonic production – Magnetostriction method – Piezoelectric method – Determination of velocity using acoustic grating - Applications (SONAR, Acoustics of grating).

### UNIT – III CRYSTALLOGRAPHY (9)

Crystalline solids – Amorphous solids – Space lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – 'd' spacing in cubic lattice – Calculation of atoms per unit cell – Atomic radius – Coordination number and Packing factor for SC, BCC, FCC and HCP structures.

### UNIT – IV OPTICS AND PHOTOELASTICITY (10)

**Interference:** Air Wedge – Testing of Flat surfaces – Michelson's Interferometer – Types of fringes – Applications: Wavelength determination – Thickness of a transparent medium.

**Optical Instruments:** Metallurgical microscope and Scanning electron microscope – Applications.

**Photo elasticity:** Theory of photo elasticity – Stress optic law – Isoclinic and Isochromatic fringes - Photoelastic bench and its use.

### UNIT – V LASER AND FIBER OPTICS (10)

**Laser:** Basic Principle – Einstein theory – Characteristics of laser – Nd:YAG laser – CO<sub>2</sub> laser – Semiconductor laser (homojunction) – Determination of wave length of laser using grating – Particle size – Application: Communication, Engineering and Medicine, Holography

**Fiber Optics:** Principles of optical fiber – Propagation of optical signal through fiber – expressions for acceptance angle and numerical aperture – Step index and Graded index fibers – Fiber optic communication system (Block diagram) – Fiber optic sensors – Displacement and pressure sensors.

**TOTAL = 48**

**TEXT BOOK:**

1. Avadhanulu M.N. and Kshirsagar P.G., “A Text Book of Engineering Physics”, S.Chand & Company Ltd., 7<sup>th</sup> Enlarged Revised Ed., 2005.
2. Gaur R.K. and Gupta S.L., “Engineering Physics”, Dhanpat Rai Publishers, New Delhi, 2001.

**REFERENCE BOOKS:**

1. Arumugam M., “Engineering Physics”, Anuradha Agencies, Kumbakonam, 2<sup>nd</sup> Edition, 2005.
2. Pillai S.O., “Solid State Physics”, New Age International Publications, New Delhi, 6<sup>th</sup> Edition, 2005.
3. Palanisamy P.K., “Physics for Engineers”, Scitech Publications (India) Pvt. Ltd., Chennai, Second Edition, 2005.
4. Chitra Shadrach and Sivakumar Vadivelu, “Engineering Physics”, Pearson Education, 1<sup>st</sup> Edition, New Delhi, 2007.

## HS1103 ENGINEERING CHEMISTRY I

**L T P**  
**4 0 0**

### **UNIT - I WATER TREATMENT PROCESS (10)**

Hardness of water -  $\text{CaCO}_3$  equivalents – Ethylene Diamine Tetra-acetic Acid (EDTA) method of estimation of hardness – Troubles of boiler feed water - Demineralization - Zeolite process – Desalination - Reverse osmosis - Electro dialysis - Water conditioning (Colloidal, Phosphate, Calgon, Carbonate) - Treatment of domestic water (UV and ozone).

### **UNIT - II THERMODYNAMICS (10)**

Thermodynamic processes – First law of thermodynamics – Limitations - Second law of thermodynamics - Clausius and Kelvin statement – Entropy - Mathematical expressions - Changes in entropy for isothermal expansion - Reversible and irreversible processes - Free energy - Gibbs Helmholtz equation – Application and simple problems – Van't Hoff isotherm and isochore - Simple problems.

### **UNIT – III ELECTROCHEMISTRY (10)**

Electrode potential – Determination – Nernst Equation – Types of cells - Reference electrodes – Hydrogen – Calomel - Glass and Quinhydrone – Determination of pH - Electromotive force (EMF) and its measurements – Applications – Concentration cells - Application and problems - EMF series – Significance – Conductometric titrations.

### **UNIT – IV ENERGY SOURCES AND ENERGY STORING DEVICES (8)**

Nuclear fission process - Chain reactions – Nuclear energy – Nuclear reactor – Light water nuclear power plant - Batteries – Primary and Secondary batteries - Alkaline battery - Lead acid storage battery - Ni-cadmium battery - Lithium battery - Fuel cells - Hydrogen Oxygen fuel cell - Photo galvanic cell.

### **UNIT – V ANALYTICAL TECHNIQUES AND CHEMO METRICS (10)**

Beer-Lambert's law - UV-Visible - IR spectroscopy - Principles and Instrumentation (block diagram only) – Estimation of iron by colorimetric analysis - Flame photometry - Principles and Instrumentation (block diagram only) – Estimation of sodium by flame photometry - Chemo metrics – Instrumental response and Data processing - Chemo metric based signal processing techniques.

**TOTAL = 48**

### **TEXTBOOKS**

1. P.C. Jain and Monika Jain, “Engineering Chemistry”, 13<sup>th</sup> Edition, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2004.
2. B.S.Bahl, G.D. Tuli and Arun Bahl, “Essentials of Physical Chemistry”, S. Chand and Company Ltd., New Delhi, 2004.

### **REFERENCE BOOKS**

1. J.C. Kuriakose and J. Rajaram, “Chemistry in Engineering and Technology”, Vol.1 & 2, Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi, 1996.
2. Mars G. Fontana, “Corrosion Engineering”, Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi, 2005.
3. B.K. Sharma, “Engineering Chemistry”, Krishna Prakasam Media (P) Ltd., Meerut, 2001.
4. F.Chau, Y. Liang, J. Gao and X. Shao, “Chemometrics”, Wiley Inter Science, 2004.

## **CS1101 DIGITAL COMPUTER FUNDAMENTALS**

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>1</b>	<b>0</b>

### **UNIT – I DIGITAL CONCEPTS (8)**

Digital Computer Fundamentals – Block diagram of a computer – Components of a computer system – Digital and Analog quantities – Binary digits – Logic Levels – Digital Waveforms – Basic Logic operations – Digital Integrated Circuits.

### **UNIT – II NUMBER SYSTEMS (12)**

Number Representation – Decimal, Binary, Octal, Hexadecimal and BCD numbers – Binary Arithmetic – Binary addition – Unsigned and Signed numbers – one's and two's complements of Binary numbers – Arithmetic operations with signed numbers - Number system conversions – Digital codes.

### **UNIT - III BOOLEAN ALGEBRA AND LOGIC SIMPLIFICATION (16)**

Logic gates – AND, OR, NOT, NAND, NOR, XOR and XNOR Gates – Laws and Rules of Boolean algebra – DeMorgan's Theorems – Standard forms of Boolean Expressions - Sum of products – Product of sums – Boolean Expression and Truth Tables – Boolean Expression Minimization using Boolean laws – The Karnaugh Map – Sum of Products and Products of Sum Minimization.

### **UNIT – IV HARDWARE AND SOFTWARE (10)**

Processing Devices – Memory Devices – Input and Output Devices – Optical Input Devices – Audiovisual Input Devices – Monitors – Printing Devices - Storage Devices – Magnetic and Optical Storage Devices - System Software – Application Software – Graphics and Multimedia.

### **UNIT – V NETWORKING FUNDAMENTALS (14)**

Data Communication with Standard Telephone Lines – Modems – Digital Data Connections – Broadband Connections – DSL Technologies – Cable Modem Connections – Computer Networking Basics – Common Types of Networks – Structuring of Networks – Network Media and Hardware.

**TOTAL = 60**

## **TEXT BOOKS**

1. Thomas L.Floyd and R.P.Jain, “Digital Fundamentals”, 8<sup>th</sup> Edition, Pearson Education, 2007.
2. Peter Norton, “Introduction to Computers”, 6<sup>th</sup> Edition, Tata Mc Graw Hill, New Delhi, 2006.

## **REFERENCES**

1. Morris Mano, “Digital Design”, 3<sup>rd</sup> Edition, Pearson Education, 2006.
2. Rajkamal, “Digital Systems: Principles and Design”, 1<sup>st</sup> Edition, Pearson Education, 2007.
3. Albert Paul Malvino, Donald P. Leech, “Digital Principles and Applications”, 6<sup>th</sup> Edition, Mc Graw Hill Publishers, 2007.

**Unit - I Projection of Points and Lines (6+12)**

Basics of Engineering Drawing - Orthographic Projections – First angle projections of a point – Second, Third and Fourth angle projections – Projections of Lines situated in the first quadrant – Angles made by Lines with the Reference Planes – Projections of lines Parallel to One and Inclined to the other Reference Plane - Projections of lines inclined to both the Reference Planes – Traces.

**Unit - II Projections of Solids (4+8)**

Solids – Projections of Solids having Axis Perpendicular to One of the Reference Planes - Projections of Solids having Axes Parallel to either to HP or VP and Inclined to Other.

**Unit - III Sections of solids and Orthographic Views (4+8)**

Cutting Planes – Drawing the Sections and Sectional Views with the axis of the solid vertical – True shape - Orthographic views of Pictorial Views – Sketching of Orthographic Views from Pictorial Views of Objects.

**Unit - IV Development of Surfaces (4+8)**

Development of lateral surfaces of solids including cut solids – Parallel line and Radial line methods.

**Unit - V Isometric and Perspective Projections (6+12)**

Types of Pictorial Projections – Isometric view and Isometric projection – Isometric Scale – Drawing Isometric Projection of Solid Objects (combination of two solids) - Perspective Projection – Terminology – Visual Ray Method – Vanishing Point method.

$$\mathbf{L + T = 24 + 48 = 72}$$

**TEXT BOOKS**

1. K.V. Natarajan, “A text book of Engineering Drawing”, Dhanalakhmi Publications, 2007.
2. M.B.Shah and B.C.Rana, “Engineering Drawing”, Pearson Education, 2005.

**REFERENCES**

1. N.D.Bhatt, “Engineering Drawing”, Charotar Publishing House, 46<sup>th</sup> Edition, 2003.
2. Luzadder and Duff, “Fundamental of Engineering Drawing”, Prentice hall of India Pvt Ltd. 11<sup>th</sup> Edition, 2001.
3. Jolhe, “Engineering Graphics”, McGraw-Hill Publications, 2007.

## HS1104 PHYSICS & CHEMISTRY LABORATORY I

L T P  
0 0 2

### PHYSICS LABORATORY

#### LIST OF EXPERIMENTS (Any 6)

1. Torsional Pendulum - Determination of Rigidity Modulus of a wire and Moment of Inertia of a disc
2. Determination of Young's Modulus of a material of the rod by Non Uniform Bending
3. Determination of coefficient of viscosity of a liquid by Poiseuille's flow method.
4. Determination of thickness of a thin wire using Air Wedge
5. Determination of dispersive power of a prism using Spectrometer
6. Laser :  
Determination of a wavelength using grating  
Determination of particle size
7. Determination of velocity of ultrasonic waves in liquids using Ultrasonic interferometer
8. Determination of numerical aperture and acceptance angle - Optical fiber

### CHEMISTRY LABORATORY

L T P  
0 0 2

#### LIST OF EXPERIMENTS (Any 6)

1. Weighing and Preparation of Standard solutions.
2. Determination of total, Permanent and temporary hardness of water by EDTA method.
3. Determination of alkalinity of water sample.
4. Conductometric titration between strong acid and strong base.
5. Conductometric titration of mixture of acids.
6. Conductometric precipitation titration using Barium chloride and sodium sulphate.
7. Estimation of iron (1, 10-phenanthroline / thiocyanate method) by spectrometric method.
8. Determination of sodium in water sample by flame photometry.
9. Conductometric determination of the solubility of a sparingly soluble salt.
10. Determination of DO content by Winkler's method.

#### **Reference:**

1. Textbook of Quantitative Inorganic Analysis, A.I. Vogel, ELBS, London.
2. Experiments in Physical Chemistry, D.P. Shoemaker and G.W. Garland, McGraw Hill, London.

## **GE1101 ENGINEERING PRACTICES LABORATORY**

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

### **Objectives**

To provide exposure to the students with hands on experience on basic engineering practices in Fitting, Carpentry, Welding Practice, Electrical Engineering Practice.

#### **1. FITTING (12)**

Name and uses of tools like files – Chisels – Hammers - Tri-square – Calipers – Hacksaw - Handling of these tools - Practice in marking – Chipping - Fitting to size and Drilling - Making of simple mating profiles such as V – Square - Dove Tail joints.

#### **2. CARPENTRY (9)**

Name uses of tools used in carpentry - Handling of the tools - Practice in marking - Planning and Chiseling to size - Making simple joints such as T-lap – Dovetail – Mortise and Tenon joints.

#### **3. WELDING (6)**

Preparation of butt joints - Lab joints and Tee joints using arc welding - Gas welding Practice.

#### **4. ELECTRICAL ENGINEERING PRACTICE (9)**

Stair-Case wiring - Fluorescent lamp wiring - Residential house wiring using switches – Fuse – Indicator - Lamp and Energy meter.

**TOTAL = 36**

## SEMESTER II

### HS1151 – TECHNICAL ENGLISH II

L	T	P
4	0	0

#### UNIT I FOCUS ON LANGUAGE 10

Voice and Tense – Reported Speech – Relative Clauses – Adverbial Clauses of Time, Place and Manner - Cause and Effect Expressions – Indicators of Purpose and Function – Acronyms and Abbreviations – British and American Vocabulary – Spelling, Punctuation and Capitalization – Common Errors.

#### UNIT II INTERVIEWS AND GROUP COMMUNICATION 10

Interviews – Objective of Interviews – Types of Interviews – Job Interviews – Group Discussion – Organizational Group Discussions – Group Discussion as part of a Selection Process – Meetings – Conferences.

#### UNIT III LETTERS, MEMOS AND E-MAIL 10

Letters – Business Letters – Significance – Structure and Layout – Principles – Types and Samples – Claim Letters – Adjustment Letters – Sales Letters – Job Application Letters – Memos – Classification and Purpose – Style – E-mails – E-mail Etiquettes – Sample E-mail Messages – Effectiveness and Security.

#### UNIT IV REPORTS 10

Reports – Objectives – Characteristics of a Report – Types of Reports – Importance of Reports – Formats – Prewriting – Structure of Reports – Writing the Report – Visual Aids – Revising, Editing and Proofreading – Proofreading Symbols.

#### UNIT V WRITING 8

Making Recommendations by using Modal Auxiliary Verbs like *should*, *must*, *ought to* etc. – Preparation of Checklists – Giving Instructions.

**Total: 48**

#### TEXT BOOK

1. Meenakshi Raman and Sangeetha Sharma, “Technical Communication: Principles and Practice”, Oxford University Press, New Delhi, 2004.

#### REFERENCES

1. Andrea J. Rutherford, “Basic Communication Skills for Technology”, Pearson Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.
2. Ashraf Rizvi, “Effective Technical Communication”, Tata McGraw-Hill, New Delhi, 2005.
3. Ramakrishna Rao, “Learning English : A communicative Approach”, Orient Longman, Hyderabad, 2006.
4. William Sanborn Pfeiffer and T.V.S. Padmaja, “Technical Communication: A Practical Approach”, Sixth Edition, Pearson Education, 2007.

## MA1151 MATHEMATICS II

<b>L</b>	<b>T</b>	<b>P</b>
<b>4</b>	<b>1</b>	<b>0</b>

### UNIT I      **MULTIPLE INTEGRALS**      **10+3**

Double integration – Cartesian and Polar Co-ordinates – Change of order of integration – Area as a double integral – Change of variables between Cartesian and Polar Co-ordinates – Triple integration – Volume as a triple integral.

### UNIT II      **VECTOR CALCULUS**      **9+2**

Gradient, Divergence and Curl – Directional derivative – Irrotational and Solenoidal vector fields – Vector integration – Problem solving using Green’s theorem, Gauss divergence theorem and Stoke’s theorem – Simple applications and verifications.

### UNIT III      **ANALYTIC FUNCTIONS**      **9+2**

Necessary and Sufficient conditions (without proof) – Cauchy-Riemann equations – Properties of analytic functions – Harmonic conjugate – Construction of Analytic functions – Conformal mapping:  $w = z+a$ ,  $az$ ,  $1/z$ ,  $Z^2$  and bilinear transformation.

### UNIT IV      **COMPLEX INTEGRATION**      **10+2**

Problems solving using Cauchy’s integral theorem and integral formula – Taylor’s and Laurent’s expansions – Residues – Cauchy’s residue theorem – Contour integration over unit circle – Semicircular contours with no pole on real axis.

### UNIT V      **LAPLACE TRANSFORMS**      **10+3**

Transforms of elementary functions – Basic properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse Laplace transforms – Convolution theorem – Solution of Ordinary Differential Equations with constant coefficients using Laplace transforms – Transform of periodic functions – Solution of integral equations.

**L: 48 T: 12 Total: 60**

### TEXT BOOK

1. Grewal, B.S., “Higher Engineering Mathematics”, Thirty eighth Edition, Khanna Publishers, New Delhi, 2005.

### REFERENCES

1. Glyn James., “Advanced Modern Engineering Mathematics”, Third Edition, Pearson Education Ltd, New Delhi, 2004.
2. Venkataraman. M. K., “Engineering Mathematics”, Volume I and II Revised enlarged Fourth Edition, The National Publishing Company, Chennai, 2004.
3. Veerarajan. T., “Engineering Mathematics (for first year)”, Fourth Edition, Tata McGraw – Hill Publishing Company Limited, New Delhi, 2005.
4. V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, “Engineering Mathematics”, Fifth Edition, Vikas Publishing house Pvt. Ltd., New Delhi, 2006.

## HS1152 ENGINEERING PHYSICS II

L	T	P
4	0	0

### UNIT I CONDUCTING MATERIALS (10)

Classical free electron theory of metals – Thermal and Electrical conductivity – Wiedemann–Franz law (Derivation) - Lorenz number – Drawbacks of classical theory – Fermi distribution function – Density of energy states – Effect of temperature on Fermi energy – Electron in a periodic potential (Kronig–Penney model) - Origin of band gap in solids – Effective mass of electrons and holes.

### UNIT II SEMICONDUCTING AND SUPERCONDUCTING MATERIALS 10

**Intrinsic Semiconductor:** Expressions for the carrier concentration – Calculation of density of holes and electrons - Fermi level and its variation with temperature – Determination of band gap energy.

**Extrinsic Semiconductors:** Carrier concentration in n-type and p-type semiconductors (no derivation - qualitative) - Variation of Fermi level with temperature and impurity concentration - Hall Effect – Determination of Hall coefficient.

**Super Conductors:** Superconductivity – Properties – Meissner effect – Type I and Type II Superconductors – High temperature Super conductors – Applications – Magnetic levitation – Josephson Effect – SQUID.

### UNIT III MAGNETIC AND DIELECTRIC MATERIALS 11

**Magnetic materials:** Magnetic moment – Dia and Paramagnetism (qualitative) – Ferromagnetism – Domain theory of Ferromagnetism – Antiferromagnetic – Ferrites: Applications – Magnetic recording – Storage of magnetic data – Tapes, Floppy and Magnetic disc devices – Magnetic memories – Ferrite core memory and Bubble memory.

**Dielectric materials:** Electronic, Ionic, Orientational and Space Charge polarisation – Frequency and Temperature dependence of polarization – Internal field – Determination of Clausius–Mosotti relation – Dielectric loss – Dielectric breakdown.

### UNIT IV NON-DESTRUCTIVE TESTING 7

Liquid penetrant method – Ultrasonic flaw detector – X-ray radiography – X-ray fluoroscopy – Thermography – Merits and Demerits of all methods.

### UNIT V NEW ENGINEERING MATERIALS 10

Metallic glasses – Nanophase materials – Shape memory alloys (Thermal and Magnetic) – Biomaterials (Metals and alloys, ceramics) – Nonlinear materials – Second harmonic generation – Optical mixing.

**Total: 48**

### **TEXT BOOKS**

1. Avadhanulu M.N. and Kshirsagar P.G., “A Text Book of Engineering Physics”, S.Chand & Company Ltd., 7<sup>th</sup> Enlarged Revised Ed., 2005.
2. Pillai S.O., “Solid State Physics”, New Age International Publications, New Delhi, 6<sup>th</sup> Edition, 2005.

### **REFERENCES**

1. Arumugam M., “Engineering Physics”, Anuradha Agencies, Kumbakonam, 2<sup>nd</sup> Edition, 2005.
2. Gaur R.K. and Gupta S.L., “Engineering Physics”, Dhanpat Rai Publishers, New Delhi, 2001.
3. Palanisamy P.K., “Physics for Engineers”, Scitech Publications (India) Pvt. Ltd., Chennai, 2<sup>nd</sup> Edition, 2005.
4. Chitra Shadrach and Sivakumar Vadivelu, “Engineering Physics”, Pearson Education, 1<sup>st</sup> Edition, New Delhi, 2007.

## HS1153 ENGINEERING CHEMISTRY II

L	T	P
4	0	0

### **UNIT I      ENGINEERING MATERIALS      10**

Abrasives – Natural abrasives (Diamond and Corundum) – Synthetic abrasives (Silicon carbide and Boron carbide) – Refractories – Characteristics - Classification and Properties – Manufacture of refractories (Alumina, Zirconia and Magnesite bricks) Adhesives – Action - Classification with example - Lubricants - Classification with example – Solid lubricants - Graphite - Molybdenum sulphide.

### **UNIT II      CORROSION AND PROTECTIVE COATINGS      9**

Principle of corrosion - Chemical and Electrochemical corrosion - Galvanic corrosion – Differential aeration corrosion - Corrosion control methods - Cathodic protection - Sacrificial anode - Corrosion inhibitors – Paints - Constituents – special paints - Fire retardant - Water repellent - Temperature indicating paints - Varnishes and Lacquers - Electroplating and Electroless plating - Surface conversion coating - Anodizing and Hot dipping.

### **UNIT III      HIGH POLYMERS      9**

Preparation - Properties and Uses of PVC – Teflon – Polystyrene - Polycarbonate and Thermo Cole – Resins - Urea-formaldehyde - Phenol-formaldehyde and Epoxy resins - Compounding of Plastics - Injection moulding - Compression moulding.

### **UNIT IV      FUELS AND COMBUSTION      10**

Analysis of Coal - Proximate and Ultimate analysis - Coke manufacture - Otto Hoffman method - Characteristics of metallurgical coke - Synthetic petrol - Bergius and Fischer Tropsch method – Knocking - Octane number - Cetane number – Production, Composition and Uses of producer and Water gas - Combustion – Gross and Net Calorific value - Theoretical calculation of calorific values – Simple problems - Calculation of minimum requirement of air - Simple problems - Flue gas analysis - Orsat's apparatus.

### **UNIT V      CHEM-INFORMATICS      10**

Definition – Coordinate – Bonds - Bond length - Bond angles - Torsional angles - Chemical structure – Definition - Conformation – Representation of structural information - Linear format - SMILEYF notation - MOL format- PDB format - Storage of structural data in a data base - structural keys - Finger print - Canonical structure - Similarity search - Sub structure search - Application of chem-informatics in drugs designing.

**Total: 48**

### **TEXTBOOKS**

1. P.C.Jain and Monika Jain, "Engineering Chemistry", 13<sup>th</sup> Edition, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2004.
2. Andrew Leach, "Molecular Modeling concept and Application", 2<sup>nd</sup> edition, Pearson Edn., Ltd., ESSEX, England, 2001.

### **REFERENCES**

1. J.C. Kuriakose and J. Rajaram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata Mcgraw Hill Publishing Company, New Delhi, 1996.
2. Mars G. Fontana, "Corrosion Engineering", Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi, 2005.
3. B.K. Sharma, "Engineering Chemistry", Krishna Prakasam Media (P) Ltd., Meerut, 2001.

## CE1151 ENGINEERING MECHANICS

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4	0	0

### UNIT I      **STATICS OF PARTICLES**      **10**

Units and Dimensions – Law of Mechanics – Vectorial representation forces and moments - Vector Operation - Addition, subtraction, dot product, cross product – Concepts of Particles and Rigid bodies – Composition of concurrent forces in Plane – Free body Diagram – Equilibrium of Rigid bodies in Two dimensions.

### UNIT II      **PROPERTIES OF SURFACES, MOMENTS AND PRODUCTS OF INERTIA**      **12**

Determination of Areas – First moment of area – Centroid of sections – Rectangle, Circle, Triangle, T section, I section, Angle section, Hollow section – Second and Product moments of Plane area – Rectangle, Triangle, Circle, T section, I section, Angle section, Hollow section – Parallel axis theorem - Perpendicular axis theorem – Polar Moment of Inertia.

### UNIT III      **FRICTION**      **7**

Laws of coulomb Friction – Coefficient of Friction – Dry Friction – Sliding Friction – Ladder friction – Belt friction – V-Belt – Screw Jack – Rolling Resistance.

### UNIT IV      **KINEMATICS OF PARTICLES**      **10**

Introduction – Velocity and Acceleration – Rectangular Components – Kinematical Relations and Applications – Newton’s Law – Rectilinear Translation – Curvilinear motion – Components of motion – Projectile motion.

### UNIT V      **WORK ENERGY METHODS, IMPULSE AND MOMENTUM**      **9**

Work Energy Method – Conservation of Energy – Impulse and Momentum Relation – Impulsive Forces – Impact force – Conservation of momentum – Moment of Momentum Equation.

**Total: 48**

### **TEXT BOOKS**

1. Irving H. Shames and G.Krishna Mohana Rao, “Engineering Mechanics – Statics and Dynamics”, 4<sup>th</sup> Edition, Pearson Education, 2006.
2. M.V Seshagiri Rao and D Rama Durgaiyah, “ Engineering Mechanics”, University Press, 2005.

### **REFERENCES**

1. Beer F.P and Johnson E.R., “Vector Mechnics for Engineers – Statics and Dynamics”, Tata McGraw-Hill Publishing Compony Ltd., New Delhi, 2001.
2. K.V.Natarajan, “Engineering Mechanics”, Dhanalakshmi Publishers, Chennai, 2006.

## GE1151 BASIC ENGINEERING

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3	0	0

### MECHANICAL ENGINEERING

#### UNIT I SOURCES OF ENERGY AND POWER PLANTS 6

Renewable and Non-renewable resources – Thermal Power Plant – Hydro-Electric Power Plant – Nuclear Power Plant – Diesel Engine Power Plant – Gas Turbine Power Plant – Solar Power Plant – Wind Power Generation.

#### UNIT II INTERNAL COMBUSTION 8

Engines – Working principle of Petrol and Diesel Engines – Four stroke and Two stroke cycle – Fuel system in a Petrol Engine – Single jet carburetor – Coil ignition system – Sparkplug – Cooling system in I.C. Engines – Lubrication system – Fuel system for Diesel Engines – Fuel injector.

#### UNIT III BOILERS AND WELDING 8

Classification – Working of Cochran Boiler – Locomotive Boiler – Babcock and Wilcox Boiler – Modern High Pressure Boilers – Lamont – Benson – Boiler Mountings – Principle of welding – Types of welded joints – Arc welding – Gas welding – Resistance welding – Spot welding – Gas cutting – Brazing – Soldering.

### CIVIL ENGINEERING

#### UNIT IV BUILDING CONSTRUCTION AND FOUNDATION 6

**Constructions:** Properties - Uses of constructions materials namely Bricks, Stones, Steel-sections, Cement, Cement concrete, Plywood, Plastics and Composite materials.

**Foundation:** Selection of site – Objectives of foundation – Requirement of good foundation – Loads on foundation – Types of foundation.

#### UNIT V ROADS, BRIDGES, RAILWAYS AND WATER SUPPLY 8

**Roads:** Introduction – Advantages of good system of Roads – Classification of Roads,

**Bridges:** Introduction – Necessity of Bridges – Components of Bridges – Classification of Bridges.

**Railways:** Introduction – Advantages of Railways – Railway track and Components of Railway track.

**Water Supply:** Introduction – Objective of protected water supply – Steps involved on planning water supply system – Per capita consumption and factors affecting per capita consumption.

**Total: 36**

**TEXT BOOKS**

1. M.S. Palanichamy, C. Shanmugham, “Basic Civil Engineering and Basic Mechanical Engineering”, Tata McGraw–Hill Publishing Company Ltd., 2000.

**REFERENCES**

1. K. Venugopal and V. Prabhu Raja, “Basic Mechanical Engineering”, 6<sup>th</sup> Edition, Anuradha Agencies, 2005.
2. R. Rudramoorthy, “Thermal Engineering”, Tata McGraw – Hill Publishing Company Ltd, 2005.
3. S. Ramamrutham, “Basic Civil Engineering”, Dhanpat Rai Publishing Company (P) Ltd., 1999.

## PHYSICS AND CHEMISTRY LABORATORY II

### PHYSICS LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>
<b>0</b>	<b>0</b>	<b>2</b>

#### LIST OF EXPERIMENTS (Any 6)

1. Determination of Young's Modulus of a material of the bar - Uniform Bending
2. Thermal conductivity of a bad conductor - Lee's Disc Method
3. Spectrometer : i-d curve
4. Determination of radius of curvature of a lens by Newton's ring method
5. Spectrometer - Determination of wavelength of Hg spectrum using Grating
6. Determination of band gap of a semiconducting material.
7. Potentiometer - Measurement of resistance of the given wire.
8. Potentiometer - Determination of Thermo-emf using Thermo couple.
9. Logic Gates - OR,AND, NOT, NOR & NAND

### CHEMISTRY LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>
<b>0</b>	<b>0</b>	<b>2</b>

#### LIST OF EXPERIMENTS (Any 6)

1. Determination of chloride content of water sample by argentometric method.
2. Determination of strength of HCl by pH meter.
3. Estimation of copper in brass.
4. Determination of strength of iron by potentiometric method using dichromate.
5. Determination of molecular weight of a polymer by viscometry method.
6. Determination of percentage of calcium in limestone by EDTA method.
7. Determination of corrosion rate of given specimen by weight loss method.
8. Determination of BOD in sewage.
9. Determination of flue gas by Orsat method.
10. Determination of unknown dye concentration by spectrophotometer method.

#### REFERENCES

1. Textbook of Quantitative Inorganic Analysis, A.I. Vogel, ELBS, London.
2. Experiments in Physical Chemistry, D.P. Shoemaker and G.W. Garland, McGraw Hill, London.

# COMPUTER LABORATORY

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1 0 3

The students should be taught C programming in class room session followed by programming practice in the lab session.

## LIST OF EXERCISES

Unit	Concepts	Suggested Exercises
UNIT I	<b>Introduction to Application Packages</b>	Practical Exercises may be given in the application packages to acquire skills in word processing and presentation
	<b>Word</b>	1. To create an advertisement in word. 2. To illustrate the concept of mail merging, importing images, tables in word.
	<b>Spreadsheet</b>	3. To create a spread sheet to analyze the marks of the students of a class and also to create appropriate charts.
	<b>Power Point</b>	4. To create the presentation for the department with Power Point using animation, Design Templates and Effective presentation.
UNIT II	<b>C Programming Basics</b>	The following exercises may be suggested
	<b>Operators &amp; Expressions</b>	5. To write a simple menu driven calculator program using switch statement,
	<b>IO Formatting</b>	6. To Find Age in terms of years, months and days.
	<b>Decision Making</b>	7. To print multiplication table for the given number.
UNIT III	<b>Looping</b>	8. To check and print if the given number is a palindrome or not, and the given number is a prime number or not
		9. To print Fibonacci and Trigonometric series.
		Exercises may be given to understand function prototype and invocation procedures, to understand call by value, call by address and implement recursion.
		10. To find the largest and smallest number using array
UNIT III	<b>Arrays</b>	11. To Sort numbers in an array in ascending / Descending order.
		12. To implement bubble sorting.
		13. To reverse the elements given in an array.
		14. Write a program for matrix addition and multiplication
UNIT IV	<b>String Manipulations</b>	15. To implement string manipulation functions without using library functions.
	<b>Functions</b>	16. To arrange the names in alphabetic order.
	<b>Recursions</b>	17. To perform sequential search using functions.
	<b>Structures</b>	18. To find the factorial of a number using recursion.
UNIT IV	<b>Pointers</b>	19. To print the marksheet of 'n' students using structures.
	<b>Files</b>	20. To print the elements of an array using pointers and String manipulation.
UNIT V	<b>Command line arguments</b>	21. To print the marksheet of 'n' students using file handling operations.
		2. To merge two files using command line arguments.

