

**Circuit branches**

**I year syllabus for B.Tech (EEE, ECE, ETE, CSE, IT, ICE, EIE, ECM & BME)  
for the Academic Year 2009-2010**

**I YEAR COURSE STRUCTURE**

I Year

Code	Group	Subject	L	T/P/D	C
HSS		English	2	-	4
BS		Mathematics - I	3	1	6
BS		Mathematical Methods	3	1	6
BS		Engineering Physics	2	1	4
BS		Engineering Chemistry	2	-	4
EAS		Computer Programming & Data Structures	3	-	6
EAS		Engineering Drawing	2	3	4
EAS		Computer Programming Lab.	-	3	4
BS		Engineering Physics / Engineering Chemistry Lab.	-	3	4
HSS		English Language Communication Skills Lab.	-	3	4
EAS		IT Workshop / Engineering Workshop	-	3	4
		<b>Total</b>	<b>17</b>	<b>18</b>	<b>50</b>

**Non-Circuit branches**

**I year syllabus for B.Tech (AE, AME, Biotech\*, Ch Engg., CE, ME (Mechatronics), ME (Prod.), ME, MMT) for the Academic Year 2009-2010**

**I YEAR COURSE STRUCTURE**

Code	Group	Subject	L	T/P/D	C
HSS		English	2	-	4
BS		Mathematics - I	3	1	6
BS		Engineering Mechanics/ Fundamental of Biology *	3	1	6
BS		Engineering Physics	2	1	4
BS		Engineering Chemistry	2	-	4
EAS		Computer Programming & Data Structures	3	-	6
EAS		Engineering Drawing	2	3	4
EAS		Computer Programming Lab.	-	3	4
BS		Engineering Physics / Engineering Chemistry Lab	-	3	4
HSS		English Language Communication Skills Lab.	-	3	4
EAS		Engineering Workshop / IT Workshop	-	3	4
		<b>Total</b>	<b>17</b>	<b>18</b>	<b>50</b>

\* **Note:** For B.Tech Biotechnology programme Fundamental of Biology (FOB) can be introduced in place of Engineering Mechanics.

T-Tutorial

L – Theory

P – Practical

D - Drawing

C – Credits

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech.

L	T/P/D	C
2	-/-/-	4

## ENGLISH

## 1. INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development and practice of language skills.*

## 2. OBJECTIVES:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

## 3. SYLLABUS:

**Listening Skills:**

## Objectives

- To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening so that can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

**Speaking Skills:**

## Objectives

- To make students aware of the role of speaking in English and its contribution to their success.
- To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text:

*Learning English : A Communicative Approach.*)

- Just A Minute(JAM) Sessions.

**Reading Skills:**

## Objectives

- To develop an awareness in the students about the significance of silent reading and comprehension.
- To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

**NOTE :** *The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as magazines/newspaper articles.*

**Writing Skills :**

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Editing a passage

**4. TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Eight Units**, are prescribed:

***For Detailed study***

**1 First Text book entitled "Enjoying Everyday English", Published by Sangam Books, Hyderabad**

***For Non-detailed study***

**1. Second text book "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

**A. STUDY MATERIAL:**

Unit –I

**1. Chapter entitled *Heaven's Gate* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**

**2 Chapter entitled *Haragovind Khorana* from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit –II

**1. Chapter entitled *Sir CV Raman: A Pathbreaker in the Saga of Indian Science* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**

**2 Chapter entitled *Sam Petroda* from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit –III

**1 Chapter entitled *The Connoisseur* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**

**2 Chapter entitled *Mother Teresa* from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit –IV

1. Chapter entitled *The Cuddalore Experience* from “Enjoying Everyday English”, Published by Sangam Books, Hyderabad

2 Chapter entitled *Dr Amartya Kumar Sen* from “Inspiring Speeches and Lives”, Published by Maruthi Publications, Guntur

#### Unit –V

1. Chapter entitled *Bubbling Well Road* from “Enjoying Everyday English”, Published by Sangam Books, Hyderabad

2 Chapter entitled *I Have a Dream* by Martin Luther King from “Inspiring Speeches and Lives”, Published by Maruthi Publications, Guntur

#### Unit –VI

1. Chapter entitled *Odds Against Us* from “Enjoying Everyday English”, Published by Sangam Books, Hyderabad

2 Chapter entitled *Ask Not What Your Country can do for you* by John F Kennedy from “Inspiring Speeches and Lives”, Published by Maruthi Publications, Guntur

\* Exercises from the lessons not prescribed shall also be used for classroom tasks.

#### Unit – VII

##### Exercises on

- Reading and Writing Skills
- Reading Comprehension
- Situational dialogues
- Letter writing
- Essay writing

#### Unit – VIII

##### Practice Exercises on Remedial Grammar covering

- Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions, Tense and aspect

##### Vocabulary development covering

- Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

#### REFERENCES :

1. **Innovate with English: A Course in English for Engineering Students**, edited by T Samson, Foundation Books
2. **English Grammar Practice**, Raj N Bakshi, Orient Longman.
3. **Effective English**, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
4. **Handbook of English Grammar & Usage**, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
5. **Spoken English**, R.K. Bansal & JB Harrison, Orient Longman.
6. **Technical Communication**, Meenakshi Raman, Oxford University Press
7. **Objective English** Edgar Thorpe & Showick Thorpe, Pearson Education
8. **Grammar Games**, Renuvolcuri Mario, Cambridge University Press.
9. **Murphy’s English Grammar with CD**, Murphy, Cambridge University Press.
10. **Everyday Dialogues in English**, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
11. **ABC of Common Errors** Nigel D Turton, Mac Millan Publishers.
12. **Basic Vocabulary** Edgar Thorpe & Showick Thorpe, Pearson Education
13. **Effective Technical Communication**, M Ashraf Rizvi, Tata Mc Graw –Hill.

14. An Interactive Grammar of Modern English, **Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO**
15. A Communicative Grammar of English, **Geoffrey Leech, Jan Svartvik, Pearson Education**
16. Enrich your English, **Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,**
17. A Grammar Book for You And I, **C. Edward Good, MacMillan Publishers.**

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## MATHEMATICS – I

**UNIT – I Sequences – Series**

Basic definitions of Sequences and series – Convergences and divergence – Ratio test – Comparison test – Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence

**UNIT – II Functions of Single Variable**

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints

**UNIT – III Application of Single variables**

Radius, Centre and Circle of Curvature – Evolutes and Envelopes Curve tracing – Cartesian, polar and Parametric curves.

**UNIT – IV Integration & its applications**

Riemann Sums, Integral Representation for lengths, Areas, Volumes and Surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals – change of order of integration- change of variable

**UNIT – V Differential equations of first order and their applications**

Overview of differential equations- exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories and geometrical applications.

**UNIT – VI Higher Order Linear differential equations and their applications**

Linear differential equations of second and higher order with constant coefficients, RHS term of the type  $f(X) = e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , and  $x^n$ ,  $e^{ax} V(x)$ ,  $x^n V(x)$ , method of variation of parameters. Applications bending of beams, Electrical circuits, simple harmonic motion.

**UNIT – VII Laplace transform and its applications to Ordinary differential equations**

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

**UNIT – VIII Vector Calculus**

Vector Calculus: Gradient- Divergence- Curl and their related properties Potential function - Laplacian and second order operators. Line integral – work done — Surface integrals - Flux of a vector valued function. Vector integrals theorems: Green's -Stoke's and Gauss's Divergence Theorems (Statement & their Verification) .

**TEXT BOOKS:**

1. Engineering Mathematics – I by P.B. Bhaskara Rao, S.K.V.S. Rama Chary, M. Bhujanga Rao.
2. Engineering Mathematics – I by C. Shankaraiah, VGS Booklinks.

**REFERENCES:**

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
2. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
3. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
4. Higher Engineering Mathematics – B.S. Grewal, Khanna Publications.
5. Advance Engineering Mathematics by Jain and S.R.K. Iyengar, Narosa Publications.
6. A text Book of KREYSZIG'S Engineering Mathematics, Vol-1 Dr .A. Ramakrishna Prasad. WILEY publications

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## MATHEMATICAL METHODS

**UNIT – I : Solution for linear systems**

Matrices and Linear systems of equations: Elementary row transformations-Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- LU Decomposition- LU Decomposition from Gauss Elimination –Solution of Tridiagonal Systems-Solution of Linear Systems

**UNIT – II : Eigen Values & Eigen Vectors**

Eigen values, eigen vectors – properties – Condition number of rank, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix. Calculation of powers of matrix – Modal and spectral matrices.

**UNIT – III : Linear Transformations**

Real matrices – Symmetric, skew - symmetric, orthogonal, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and eigen vectors of complex matrices and their properties. Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index - signature - Sylvester law, Singular value decomposition.

**UNIT – IV : Solution of Non- linear Systems**

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

**Interpolation:** Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations - Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula. B. Spline interpolation - Cubic spline.

**UNIT – V : Curve fitting & Numerical Integration**

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares. Numerical Differentiation – Simpson's 3/8 Rule , Gaussian Integration, Evaluation of principal value integrals, Generalized Quadrature.

**UNIT – VI : Numerical solution of IVP's in ODE**

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods –Predictor-Corrector Methods- Adams-Bashforth Method.

**UNIT – VII Fourier Series**

Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

**UNIT – VIII Partial differential equations**

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations, Method of separation of variables for second order equations -Two dimensional wave equation.

**TEXT BOOKS:**

1. Mathematical Methods by P.B.Bhaskara Rao, S.K.V.S. Rama Chary, M.Bhujanga Rao, B.S.Publications.
2. Mathematical Methods by K.V.Suryanarayana Rao by Scitech Publications.

**REFERENCES:**

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
4. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
5. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications.

6. A text Book of KREYSZIG'S Mathematical Methods, Dr .A. Ramakrishna Prasad. WILEY publications.



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## ENGINEERING PHYSICS

## UNIT-I

**1. Bonding in Solids:** Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy.

**2. Crystallography and Crystal Structures:** Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond and hcp Structures, Structures of NaCl, ZnS, CsCl.

## UNIT-II

**3. X-ray Diffraction:** Basic Principles, Bragg's Law, Laue Method, Powder Method, Applications of X- ray Diffraction.

**4. Defects in Crystals:** Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects; Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector, Surface Defects and Volume Defects.

## UNIT-III

**5. Elements of Statistical Mechanics:** Maxwell-Boltzman, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Photon gas, Wein's Law, Rayleigh-Jeans law,, Planck's Law of Black Body Radiation, Concept of Electron Gas, Fermi Energy, Density of States.

**6. Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function - Particle in One Dimensional Potential Box.

## UNIT-IV

**7. Band Theory of Solids:** Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron and Hole.

## UNIT-V

**8. Semiconductor Physics:** Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect.

**9. Physics of Semiconductor Devices:** Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, I-V Characteristics of PN Junction, PN Diode as a Rectifier (Forward and Reverse Bias), Diode Equation, LED, LCD and Photo Diodes.

## UNIT-VI

**10. Dielectric Properties:** Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.

**11. Magnetic Properties:** Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications, Concept of Perfect Diamagnetism, Meissner Effect, Magnetic Levitation, Applications of Superconductors.

## UNIT-VII

**12. Lasers:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.

**13. Fiber Optics:** Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Attenuation in Optical Fibers, Application of Optical Fibers.

**UNIT-VIII**

**14. Acoustics of Buildings & Acoustic Quieting:** Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time(Qualitative Treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies. Acoustic Quieting: Aspects of Acoustic Quieting, Methods of Quieting, Quieting for Specific Observers, Mufflers, Sound-proofing.

**15. Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization(XRD&TEM) and Applications.

**TEXT BOOKS:**

1. Applied Physics – P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd., Fifth Print 2008).
2. Applied Physics – S.O. Pillai & Sivakami (New Age International (P) Ltd., Second Edition 2008).
3. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).

**REFERENCES:**

1. Solid State Physics – M. Arumugam (Anuradha Publications).
2. Modern Physics – R. Murugesan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
3. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
4. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
5. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
6. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
7. Solid State Physics – A.J. Dekker (Macmillan).
8. Applied Physics – Mani Naidu Pearson Education

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## ENGINEERING CHEMISTRY

## UNIT I:

**Electrochemistry and Batteries:** Concept of Electro Chemistry, Conductance-Electrolyte in solution, Conductance-Specific, Equivalent and molar conductance, Ionic mobilities, Kohlrausch's Law. Application of conductance. EMF: Galvanic Cells, types of Electrodes, Reference Electrode (SCE, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode) Nernst equation, Concentration Cells, Galvanic series, Potentiometric titrations, Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries, fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells.

## UNIT II:

**Corrosion and its corrosion control:** Introduction, causes and different types of corrosion and effects of corrosion, theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment-effect of temperature, effect of pH, Humidity, effect of oxidant. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – methods of application on metals- hot dipping, galvanizing, tinning, cladding, electroplating - Organic surface coatings – paints constituents and functions.

## UNIT III:

**Polymers:** Types of Polymerization, Mechanism (Chain growth & Step growth).Plastics: Thermoplastic resins & Thermo set resins. Compounding & fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon. Conducting Polymers: Poly acetylene, polyaniline, conduction, doping, applications. Liquid Crystal polymers: Characteristics and uses Rubber – Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, fiber reinforced plastics (FRP), applications

## UNIT IV:

**Water:** Introduction, Hardness: Causes, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water, numerical problems. Boiler troubles – Scale & sludge formation, caustic embrittlement, corrosion, priming & foaming Softening of water (Internal & external treatment-Lime soda, Zeolite, Ion exchange process and Numerical problems) Reverse osmosis, electro dialysis.

## UNIT V:

**Surface Chemistry:** Solid surfaces, types of adsorption, Langmuir adsorption isotherm, BET adsorption equip. Calculation of surface area of solid & application adsorption, classification of colloids, Electrical & optical properties micelles, applications of colloids in industry. Nano materials: Introduction, preparation and applications of nano materials

## UNIT VI:

**Energy sources:** fuels, classification – conventional fuels (solid, liquid, gaseous) Solid fuels – coal – analysis – proximate and ultimate analysis and their significance Liquid fuels – primary – petroleum – refining of petroleum-cracking knocking synthetic petrol – Bergius and Fischer Tropsch's process; Gaseous fuels – natural gas, analysis of flue gas by Orsat's method Combustion – problems, Calorific value of fuel – HCV, LCV, determination of calorific value by Junker's gas calorimeter.

#### UNIT VII:

**Phase rule:** Definitions – phase, component, degree of freedom, phase rule equation. Phase diagrams – one component system: water system. Two component system lead- silver system, heat treatment based on iron-carbon phase diagram, hardening, annealing.

#### UNIT VIII:

**Materials Chemistry:** Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: Criteria of a good lubricant, mechanism, properties of lubricants: Cloud point, pour point, flash & fire point, Viscosity. Refractories: Classification, Characteristics of a good refractory. Insulators & conductors: Classification of insulators characteristics of thermal & electrical insulators and applications of Superconductors (Nb-Sn alloy,  $YBa_2Cu_3O_{7-x}$ ), applications.

#### TEXT BOOKS:

1. Text Books of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
2. Text of Engineering Chemistry by S.S. Dara & Mukkat S. Chand & Co, New Delhi (2006)

#### REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited , New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).
3. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.
5. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning.
6. Applied Chemistry – A text for Engineering & Technology – Springer (2005).
7. Text Book of Engineering Chemistry – Shashi Chawla, Dhanpat Rai publishing Company, New Delhi (2008).
8. Engineering Chemistry – R. Gopalan, D. Venkatappayya, D.V. Sulochana Nagarajan – Vikas Publishers (2008).

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**COMPUTER PROGRAMMING AND DATA STRUCTURES**

**UNIT - I**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programmes, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

**UNIT - II**

Introduction to C Language – Background, Simple C Programme, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.  
Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Programming examples.

**UNIT - III**

Designing Structured Programmes, Functions, basics, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programmes  
Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C programme examples.

**UNIT - IV**

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.  
Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C programme examples.

**UNIT - V**

Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

**UNIT - VI**

Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C programme examples.

**UNIT - VII**

Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods.

**UNIT - VIII**

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation, Queues-operations, array and linked representations.

**TEXT BOOKS :**

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson education.

**REFERENCES:**

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
6. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
7. C Programming & Data Structures, E. Balagurusamy, TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**I Year B.Tech.**

<b>L</b>	<b>T/P/D</b>	<b>C</b>
<b>2</b>	<b>-/13</b>	<b>4</b>

**ENGINEERING DRAWING**

**UNIT – I**

**INTRODUCTION TO ENGINEERING DRAWING** : Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions. Curves used in Engineering Practice & their Constructions :

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloid and Hypocycloid
- c) Involute.
- d) Scales: Different types of Scales, Plain scales comparative scales, scales of chords.

**UNIT – II**

**DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE**

**PROJECTION**: Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to both planes, True lengths, traces.

**UNIT – III**

**PROJECTIONS OF PLANES & SOLIDS**: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes. Projections of Regular Solids inclined to both planes – Auxiliary Views.

**UNIT – IV**

**SECTIONS AND SECTIONAL VIEWS**:- Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

**DEVELOPMENT AND INTERPENETRATION OF SOLIDS**: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids

**UNIT – V**

**INTERSECTION OF SOLIDS**:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

**UNIT - VI**

**ISOMETRIC PROJECTIONS** : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

**UNIT –VII**

**TRANSFORMATION OF PROJECTIONS** : Conversion of Isometric Views to Orthographic Views – Conventions.

**UNIT – VIII**

**PERSPECTIVE PROJECTIONS** : Perspective View : Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

**TEXT BOOK :**

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing and Graphics, Venugopal / New age.
3. Engineering Drawing – Basant Agrawal, TMH

**REFERENCES :**

1. Engineering drawing – P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.
5. Engineering Drawing – Grower.
6. Engineering Graphics for Degree – K.C. John.

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## COMPUTER PROGRAMMING LAB

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To Introduce the student to simple linear data structures such as lists, stacks, queues.

## Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

## Week 1.

- Write a C program to find the sum of individual digits of a positive integer.
- A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

## Week 2.

- Write a C program to calculate the following Sum:  
Sum= $1-x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
- Write a C program to find the roots of a quadratic equation.

## Week 3

- Write C programs that use both recursive and non-recursive functions
  - To find the factorial of a given integer.
  - To find the GCD (greatest common divisor) of two given integers.
  - To solve Towers of Hanoi problem.

## Week 4

- The total distance travelled by vehicle in 't' seconds is given by distance =  $ut + 1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)

## Week 5

- Write a C program to find both the largest and smallest number in a list of integers.
- Write a C program that uses functions to perform the following:
  - Addition of Two Matrices
  - Multiplication of Two Matrices

## Week 6

- Write a C program that uses functions to perform the following operations:
  - To insert a sub-string in to a given main string from a given position.
  - To delete n Characters from a given position in a given string.
- Write a C program to determine if the given string is a palindrome or not

## Week 7

- Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.
- Write a C program to count the lines, words and characters in a given text.

## Week 8

- Write a C program to generate Pascal's triangle.



b) Write a C program to construct a pyramid of numbers.

#### Week 9

Write a C program to read in two numbers,  $x$  and  $n$ , and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots+x^n$$

For example: if  $n$  is 3 and  $x$  is 5, then the program computes  $1+5+25+125$ .

Print  $x$ ,  $n$ , the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if  $n$  is less than 0. Have your program print an error message if  $n < 0$ , then go back and read in the next pair of numbers of without computing the sum. Are any values of  $x$  also illegal? If so, test for them too.

#### Week 10

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

#### Week 11

Write a C program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

#### Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first  $n$  characters in a file.

(Note: The file name and  $n$  are specified on the command line.)

#### Week 13

a) Write a C programme to display the contents of a file.

b) Write a C programme to merge two files into a third file ( i.e., the contents of the first file followed by those of the second are put in the third file)

#### Week 14

Write a C program that uses functions to perform the following operations on singly linked list.:

- i) Creation
- ii) Insertion
- iii) Deletion
- iv) Traversal

#### Week 15

Write C programs that implement stack (its operations) using

- i) Arrays
- ii) Pointers

#### Week 16

Write C programs that implement Queue (its operations) using

- i) Arrays
- ii) Pointers

#### Week 17

Write a C program that uses Stack operations to perform the following:

- i) Converting infix expression into postfix expression
- ii) Evaluating the postfix expression

#### Week 18

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

- i) Bubble sort
- ii) Selection sort

#### Week 19

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :

- i) Linear search
- ii) Binary search

**Week 20**

Write C program that implements the following sorting method to sort a given list of integers in ascending order:

- i) Quick sort

**Week 21**

Write C program that implement the following sorting method to sort a given list of integers in ascending order:

- i) Merge sort

**Week 22**

Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

**Week 23**

Write C programs to implement the linear regression and polynomial regression algorithms.

**Week 24**

Write C programs to implement Trapezoidal and Simpson methods.

**Text Books**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
- 4 Practical C Programming, Steve Oualline, O'Reilly, SPD. TMH publications.
5. Computer Basics and C Programming, V. Rajaraman, PHI Publications.
6. Data structures and Program Design in C, R.Kruse, C.L.Tondo, B.P.Leung, M.Shashi, Pearson Education.

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## ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

**ENGINEERING PHYSICS LAB**  
(Any twelve experiments compulsory)

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Study the characteristics of p-i-n and avalanche photodiode detectors.
10. Bending losses of fibres.
11. Evaluation of numerical aperture of given fibre.
12. Energy gap of a material of p-n junction.
13. Thermo electric effect – Seebeck effect and Peltier effect.
14. Torsional pendulum.
15. Single slit diffraction using laser.

**ENGINEERING CHEMISTRY LAB**  
List of Experiments (Any 12 of the following):

**Titrimetry:**

- 1 Estimation of hardness of water by EDTA method. (or)  
Estimation of calcium in limestone by Permanganometry.

**Mineral Analysis:**

- 2 Determination of percentage of copper in brass
- 3 Estimation of manganese dioxide in pyrolusite.

**Instrumental Methods:**

4. **Colorimetry:**  
Determination of ferrous iron in cement by colorimetric method.  
(Or) Estimation of Copper by Colorimetric method.
5. **Conductometry:**  
Conductometric titration of strong acid Vs strong base.  
(or) Conductometric titration of mixture of acids Vs strong base.
6. **Potentiometry:**  
Titration of strong acid Vs strong base by potentiometry.  
(or) Titration of weak acid Vs strong base by potentiometry.

**Physical Properties:**

7. Determination of viscosity of sample oil by redwood/oswald's viscometer
8. Determination Surface Tension of lubricants.

**Identification and Preparations:**

9. Identification of functional groups present in organic compounds.
10. Preparation of organic compounds  
Asprin (or) Benzimidazole

**Kinetics:**

11. To determine the rate constant of hydrolysis of methyl acetate catalysed by an acid and also the energy of activation. (or) To study the kinetics of reaction between  $K_2S_2O_8$  and KI.
12. Demonstration Experiments ( Any One of the following) :
  - a. Determination of dissociation constant of weak acid-by PH metry
  - b. Preparation of Thiokol rubber
  - c. Adsorption on Charcoal
  - d. Heat of reaction

**TEXT BOOKS:**

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

**REFERENCE BOOKS:**

1. Text Book of engineering chemistry by R. N. Goyal and Harmendra Goel.
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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## ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

**Objectives:**

1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

**SYLLABUS :**

The following course content is prescribed for the **English Language Laboratory** sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

**Minimum Requirement:**

The English Language Lab shall have two parts:

- i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

**System Requirement ( Hardware component):**

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
  - a) Speed – 2.8 GHZ
  - b) RAM – 512 MB Minimum
  - c) Hard Disk – 80 GB
- ii) Headphones of High quality

**Suggested Software:**

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library.
- Clarity Pronunciation Power – Part I.
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.
- Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition.
- Learning to Speak English - 4 CDs.
- Vocabulary in Use, Michael McCarthy, Felicity O'Den, Cambridge.
- Murphy's English Grammar, Cambridge with CD.
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

**Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**

1. **A Handbook for English Language Laboratories** – Prof. E. Suresh Kumar, P. Sreehari, Foundation Books.
2. **Effective Communication & Public Speaking** by S. K. Mandal, Jaico Publishing House.
3. **English Conversation Practice** by Grant Taylor, Tata McGraw Hill.
4. **Speaking English effectively** by Krishna Mohan, N. P. Singh, Mac Millan Publishers.
5. **Communicate or Collapse: A Handbook of Effective Public Speaking, Group Discussions and Interviews**, by Pushpa Lata & Kumar, Prentice-Hall of India.
6. **Learn Correct English, Grammar, Usage and Composition** by Shiv. K. Kumar & Hemalatha Nagarajan, Pearson Longman
7. **Spoken English** by R. K. Bansal & J. B. Harrison, Orient Longman.
8. **English Language Communication: A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr. G. Natanam & Prof. S. A. Sankaranarayanan, Anuradha Publications, Chennai.
9. **Effective Technical Communication**, M. Ashraf Rizvi, Tata McGraw-Hill.
10. **A Practical Course in English Pronunciation**, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
11. **A text book of English Phonetics for Indian Students** by T. Balasubramanian, Mac Millan
12. **Spoken English: A foundation Course, Parts 1 & 2, Kamalesh Sadanand and Susheela punitha**, Orient Longman

**DISTRIBUTION AND WEIGHTAGE OF MARKS**

***English Language Laboratory Practical Paper:***

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by an external examiner/ or the teacher concerned with the help of another member of the staff of the same department of the same institution.

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## IT WORKSHOP/ ENGINEERING WORKSHOP

**Objectives :**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point

**PC Hardware** introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows , Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

**Internet & World Wide Web** module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

**Productivity tools** module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

**PC Hardware**

**Week 1 – Task 1 :** Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Week 2 – Task 2 :** Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

**Week 3 – Task 3 :** Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

**Week 4 – Task 4 :** Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

**Week 5 – Task 5 : Hardware Troubleshooting :** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

**Week 6 – Task 6 : Software Troubleshooting :** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

**Internet & World Wide Web**

**Week 7 - Task 1 : Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Week 8 - Task 2 : Web Browsers, Surfing the Web :** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Week 9 - Task 3 : Search Engines & Netiquette** : Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Week 10 - Task 4 : Cyber Hygiene** : Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

### **Productivity tools**

#### **LaTeX and Word**

**Week 11 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Task 1 : Using LaTeX and Word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Week 12 - Task 2 : Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Week 13 - Task 3 : Creating a Newsletter** : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

#### **Excel**

**Week 14 - Excel Orientation:** The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Week 15 - Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

#### **LaTeX and MS/equivalent (FOSS) tool Power Point**

**Week 16 - Task1** : Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Week 17- Task 2** : Second week helps students in making their presentations interactive. Topic covered during this week includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Week 18 - Task 3** : Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes :- Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.



**REFERENCES :**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
4. Upgrading and Repairing, PC's 18<sup>th</sup> e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

**ENGINEERING WORKSHOP**

**1. TRADES FOR EXERCISES :**

**At least two exercises from each trade:**

1. House Wiring
2. Carpentry
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Fitting

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

1. Metal Cutting (Water Plasma)
- 2 Power Tools in Construction, wood working, Electrical Engineering and Mechanical Engineering

**TEXT BOOK:**

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy.

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## ENGINEERING MECHANICS

## UNIT – I

Introduction to Engineering. Mechanics – Basic Concepts.

**Systems of Forces** : Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

## UNIT – II

**Equilibrium of Systems of Forces** : Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorem, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

## UNIT – III

**Centroid** : Centroids of simple figures (from basic principles ) – Centroids of Composite Figures**Centre of Gravity** : Centre of gravity of simple body (from basis principles), centre of gravity of composite bodies, pappus theorem.

## UNIT – IV

**Area moment of Inertia** : Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.**Mass Moment of Inertia** : Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

## UNIT – V

Analysis of perfect frames ( Analytical Method) – Types of Frames – Assumptions for forces in members of a perfect frame, Method of joints, Method of sections, Force table, Cantilever Trusses, Structures with one end hinged and the other freely supported on rollers carrying horizontal or inclined loads.

## UNIT – VI

**Kinematics** : Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.**Kinetics** : Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

## UNIT – VII

**Work – Energy Method** : Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

## UNIT – VIII

**Principle of virtual work**: Equilibrium of ideal systems, efficiency of simple machines, stable and unstable equilibriums

## TEXT BOOKS :

1. Engineering. Mechanics / Timoshenko & Young.
2. Engineering. Mechanics / S.S. Bhavikatti & J.G. Rajasekharappa

## REFERENCES :

1. Engineering Mechanics / Fedinand . L. Singer / Harper – Collins.
2. Engineering. Mechanics / Irving. H. Shames Prentice – Hall.
3. Engineering. Mechanics Umesh Regl / Tayal.
4. Engineering. Mechanics / R.V. Kulkarni & R.D. Askhevkar
5. Engineering. Mechanics/Khurmi/S.Chand.
6. Engineering. Mechanics / KL Kumar / Tata McGraw Hill.

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## FUNDAMENTALS OF BIOLOGY

**UNIT I: INTRODUCTION TO MICROORGANISMS**

Diversity in biological systems, Cell biology and cell structure, Difference between Prokaryotes & Eukaryotes. Kingdom systems. Five-kingdom classification General characters, Brief account on Ecology, Morphology, Nutrition, Locomotion and Reproduction, useful and harmful effects of Bacteria, Viruses, Algae, Fungi and Protozoans.

**UNIT II: PLANT BIOLOGY**

Classification of Plant Kingdom. Concepts of Growth, Meristems. Development of different plant organs; Plant growth regulators; Economic Importance of Plants, Biology of Pests in relation to Rice, Cotton, Sugarcane and Groundnut.

**UNIT III: ANIMAL BIOLOGY**

Classification of Animal Kingdom, Functions, morphology, growth and Reproduction, economic importance. Phylogeny of Invertebrate & Vertebrate Phyla, Concepts of Species & Ecosystem. Protozoan Parasites – two important forms in man (*Plasmodium*, *Entamoeba histolytica*), Helminthes (*Fasciolopsis buski*, *Taenia solium*, *Ascaris*, *Wuchereria bancrofti*)

**UNIT IV: BASIC MOLECULAR BIOLOGY**

Genetics: DNA as genetic material, Structure of DNA, DNA replication, Transcription, Translation, Genes to proteins to protein function, Gene expression and regulation, Recombinant DNA technology.

**UNIT V: HUMAN BIOLOGY I**

Introduction of body as a whole, Cells and Tissue Organization, Electrolytes and Body fluids. Physiology of Blood. Digestive system, Respiratory system and Endocrine system.

**UNIT VI: HUMAN BIOLOGY II**

Human Physiology: Biological axons and neurons, Neuromuscular and synaptic junctions, Sensory systems - hearing, taste, smell and visual receptors.

**UNIT VII: PHOTOSYNTHESIS**

Bacterial & Plant photosynthesis; oxygenic and anoxygenic photosynthesis; chlorophyll as trapper of solar energy, photosynthetic reaction centres, Hill reaction, PS I & PS II, Photophosphorylation - cyclic & non-cyclic; Dark reaction & CO<sub>2</sub> fixation.

**UNIT VIII : APPLICATIONS OF BIOTECHNOLOGY: BASIC CONCEPTS**

Drugs and Chemicals from Plants & Animals, Definition and importance (in general) of Biofuels, Biofertilizers, Biopesticides, Bioindicators and Biosensors, Microbial Enzymes, Single Cell Protein (SCP), Monoclonal Antibodies, Introduction to Transgenic Plants & Animals.

**TEXT BOOKS:**

1. H.G. Rehen and G.Reed, biotechnology Volume I & 2
2. Basic Biotechnology, Second Edition, by Colin Ratledge and Bjorn Kristiansen, Cambridge University Press.
3. Anatomy and Physiology In Health and Disease, K. J.W. Wilison and A. Waugh, Churchill & Livingston.

**REFERENCES**

- 1) Plant Physiology F.B Salisbury & C.W. Ross 4th edition Thomson Wadsworth
- 2) Dr. C.C. Chatterjee, *Human Physiology (11th Edition) Vol I and II*, Medical Allied Agency, Kolkata, 1987.
- 3) Introduction to biology and biotechnology, second edition, K.Vaitaidyanath, K. Pratap Reddy, and K.Satya Prasad, BS Publication.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech.

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## ENGINEERING WORKSHOP / IT WORKSHOP

**1. TRADES FOR EXERCISES:****At least two exercises from each trade:**

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.
9. IT Workshop-I : Computer hard ware , identification of parts , Disassembly, Assembly of computer to working condition, Simple diagnostic exercises.
10. IT workshop-II : Installation of Operating system windows and Linux , simple diagnostic exercises.

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

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

**TEXT BOOK:**

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual by Venkat Reddy.
3. Practical C Programming, Steve Oualline,O'Reilly,SPD ,TMH Publications.

**(For Non-Circuit branches)**