

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR  
ANANTAPUR – 515 002 (A.P) INDIA**

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To  
All the Principals of Colleges offering B.Tech courses.

Sir,

Please find herewith approved syllabus of I year B.Tech effective from 2009-10

The academic regulations and syllabus of rest of the course will be notified later.

Sd/- DIRECTOR  
Academic & Planning

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Course structure for B.Tech. (Regular) I year (2009-10) for affiliated Engineering Colleges.**

**For Branches: E.C.E., E.E.E., E.I.E., C.S.E., I.T., C.S.S.E., E.Cont.E., E.C.M.**

S.No	Subject	Theory	Tutorial	Drg.	Lab.	Credits
1.	English	2				4
2.	Engineering Physics	2				4
3.	Engineering Chemistry	2				4
4.	Mathematics – I	3	1			6
5.	Programming in C and Data Structures	3	1			6
6.	Mathematical Methods	3	1			6
7.	Engineering Drawing *			6		6
8.	C Programming & Data Structures Lab				3	4
9.	Engineering & I.T. Workshop #				3	4
10.	Engineering Physics and Engineering Chemistry Lab **				3	4
11.	English Language & Communication Skills Lab				3	4
	contact periods/week	15	3	6	12	52
		Total contact periods/week			36	

**For Branches: M.E., C.E, Bio-Tech.\*\*\*, Aero.E.**

Sl.No	Subject	Theory	Tutorial	Drg.	Lab.	Credits
1.	English	2				4
2.	Engineering Physics	2				4
3.	Engineering Chemistry	2				4
4.	Mathematics – I	3	1			6
5.	Programming in C and Data Structures	3	1			6
6.	Engineering Mechanics	3	1			6
7.	Engineering Drawing *			6		6
8.	C Programming & Data Structures Lab				3	4
9.	Engineering & I.T. Workshop #				3	4
10.	Engineering Physics and Engineering Chemistry Lab **				3	4
11.	English Language & Communication Skills Lab				3	4
	contact periods/week	15	3	6	12	52
		Total contact periods/week			36	

\* Engineering Drawing will have University External Exam.

\*\* The Students attend the Physics lab and Chemistry lab. in alternate week that is 3/2 per week. The end exam shall be conducted separately and average of the two exams will be recorded by the exam section

\*\*\* Students with MPC stream admitted to Bio-Tech. will have to take “Essentials of Biotechnology ” as Audit Course with no end exam or credits.

# The Students attend Engineering and IT work shop as a single lab. every week and the end exam is conducted as a single lab. sharing the Maximum marks and time for one task from Engineering workshop and one from IT workshop. The sum of the marks awarded will be recorded

**B.Tech. I Year (common to all branches)**

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**ENGLISH**

**1. INTRODUCTION :**

The sweeping changes in the world have elevated English to the status of a tool of global communication and transformed it into e-English. The syllabus has been drafted to improve the competence of students in communication in general and language skills in particular. The books prescribed serve as students' handbooks.

The teacher should focus on the skills of reading, writing, listening and speaking while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two way communications in place of the one-sided lecture.

The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

**2. OBJECTIVES:**

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

**3. SYLLABUS :**

**Listening Skills:**

Objectives

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

*Students should be given practice in listening and identifying the sounds of English language and to mark stress , right intonation in connected speech.*

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

**Speaking Skills :**

Objectives

1. To make students aware of the role of ability to speak fluent English and its contribution to their success.
2. 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 | • Just A Minute (JAM) Sessions.        |

(Using exercises from all units of the prescribed text)

**Reading Skills:**

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability 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 |

*The students shall be trained in reading skills using the prescribed text for detailed study. They shall 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 articles from magazines/newspapers*

### **Writing Skills:**

#### Objectives

1. To develop an awareness in the students the skill to write exact and formal writing
2. To equip them with the components of different forms of writing.

- Writing sentences
- Paragraph writing
- Narration / description
- Formal and informal letter writing
- Use of appropriate vocabulary
- Coherence and cohesiveness
- Note Making
- 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 are prescribed and divided into Eight Units:

*For Detailed study:* **ENJOYING EVERYDAY ENGLISH**, Sangam Books (India) Pvt Ltd  
Hyderabad, 2009

*For Non-detailed study:* **INSPIRING LIVES**, Maruti Publications, Guntur, 2009

#### **Unit -I**

- a. Heaven's Gate from **ENJOYING EVERYDAY ENGLISH**
- b. Mokshagundam Visvesaraya from **INSPIRING LIVES**

#### **Unit -II**

- a. Sir C.V.Raman from **ENJOYING EVERYDAY ENGLISH**
- b. Mother Teresa from **INSPIRING LIVES**

#### **Unit -III**

- a. The Connoisseur from **ENJOYING EVERYDAY ENGLISH**
- b. Dr. Amartya Kumar Sen from **INSPIRING LIVES**

#### **Unit -IV**

- a. The Cuddalore Experience from **ENJOYING EVERYDAY ENGLISH**
- b. Gertrude Elion from **INSPIRING LIVES**

#### **Unit -V**

- a. Bubbling Well Road from **ENJOYING EVERYDAY ENGLISH**
- b. Vishwanathan Anand from **INSPIRING LIVES**

#### **Unit-VI**

- a. Odds Against Us from **ENJOYING EVERYDAY ENGLISH**
- b. Charlie Chaplin from **INSPIRING LIVES**

**Unit – VII** Exercises on  
Reading and Writing Skills, Reading Comprehension, Letter writing, Report writing

**Unit – VIII** Exercises on  
Remedial Grammar covering Common errors in English, Subject-Verb agreement,  
Use of Articles and Prepositions, Active/Passive Voice, Reported speech, Tenses  
Vocabulary development covering Synonyms & Antonyms, one-word substitutes, prefixes & suffixes,  
Idioms & phrases, words often confused.

**Evaluation:** The question paper shall contain two parts, Part A containing questions from Units I- VI and Part B containing questions from units VII & VIII. The student is required to answer five full questions choosing at least one from Part B.

**REFERENCES:**

1. Technical Communication , Principle and Practice, Meenakshi Raman and Sangita Sharma, OUP, 2009
2. Essential Grammar in Use, (with CD) 3/e, Cambridge University Press, 2009
3. Resumes and Interviews, M.Ashraf Rizvi, Tata – McGraw Hill, 2009
4. Everyday Dialogues in English by Robert J. Dixon, Prentice-Hall of India Ltd., 2006.
5. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008
6. Developing Communication Skills, 2/e. by Krishna Mohan & Meera Banerji , Macmillan, 2009
7. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
8. Basic Communication Skills For Technology, Andrea J Ruthurford, Pearson Education , Asia.
9. Longman Dictionary of Contemporary English with DVD, Pearson Longman

**B.Tech. I Year (common to all branches)**

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**ENGINEERING PHYSICS**

**UNIT I- OPTICS:** Interference - Interference in thin films by reflection - Newton's rings - Diffraction - Fraunhofer diffraction at a single slit - Fraunhofer diffraction at a double slit - Diffraction grating - Grating spectrum - polarization - Nicol prism -Theory of circular and elliptical polarized light - Quarter and half wave plates.

**UNIT II- CRYSTAL STRUCTURES AND X-RAY DIFFRACTION:** Introduction -Space lattice - Basis - Unit cell - Lattice parameter - Bravais lattices - Crystal systems - Structure Simple cubic - Body Centered Cubic – Face Centered Cubic crystals - Miller indices of planes and directions in crystals – Separation between successive (h k l) planes - X-ray diffraction by crystal planes - Bragg's law – Laue and Powder methods.

**UNIT III- PRINCIPLES OF QUANTUM MECHANICS & ELECTRON THEORY:** Waves and Particles - de- Broglie's hypothesis – Heisenberg's uncertainty principle - Schrodinger's one dimensional wave equation (Time Independent) - Particle in a one dimensional potential box – Energy levels - Fermi-Dirac distribution and effect of Temperature (qualitative treatment only) – Scattering - Source of electrical resistance - Kronig-Penney model (qualitative treatment only) - energy bands – metals, semi conductors & insulators.

**UNIT IV- SEMICONDUCTORS:** Intrinsic and extrinsic semiconductors – Law of mass action – Continuity equation – Drift & diffusion - Einstein's relation – Hall effect – Direct & indirect band gap semiconductors – p-n junction - Band diagram of p-n junction diode – Diode Equation-LED, LCD & Photo diode.

**UNIT V- MAGNETIC PROPERTIES:** Introduction - Origin of magnetic moment – Classification of magnetic materials - Dia, Para , Ferro, anti-Ferro and Ferri magnetism - Hysteresis - Soft and hard magnetic materials – Magnetic bubbles memory.

**DIELECTRIC PROPERTIES:** Introduction - Dielectric constant - Electronic, Ionic and Orientation polarizations (qualitative treatment only) - Local field - Clausius-Mossotti equation –Frequency dependence of polarisability (qualitative treatment only) – Ferro electricity- BaTiO<sub>3</sub>.

**UNIT VI- SUPERCONDUCTIVITY:** General properties - Meissner effect - Penetration depth - Type I and Type II superconductors - Flux quantization – Josephson effects – BCS theory - Applications of superconductors.

**LASERS:** Introduction – Characteristics of laser - Spontaneous and stimulated emission of radiation - Einstein's coefficients - Population inversion - Ruby Laser - Helium-Neon Laser – GaAs Laser - Applications of Lasers in Industry, Scientific and Medical fields.

**UNIT VII- FIBER OPTICS:** Introduction - Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture – Types of Optical fibers and refractive index profiles – Optical fiber communication systems - Application of optical fibers.

**UNIT VIII- NANOMATERIALS :** Introduction - Basic principles of nano materials – Fabrication of nano materials - ball milling –plasma arching – Chemical vapour deposition method – sol-gel methods – properties of nano materials – carbon nanotubes – properties and applications of carbon nano tubes - Applications of nano materials.

**TEXT BOOKS:**

1. Engineering Physics by V. Rajendran & K.Thyagarajan, Tata McGraw-Hill Publishing Co. Ltd.
2. Engineering Physics by M.R.Srinivasan New Age Publications
3. Engineering Physics by P.K.Palanisamy, Scitech Publications

**REFERENCES:**

1. Physics Volume 2, by Halliday, Resnick and Krane; John Wiley India
2. Solid State Physics by C.Kittel, Wiley India
3. Engineering Physics by Mittal, I.K.International
4. Introduction to Nanoscience & Nano Technology by K.K Chattopadhyay & A.N. Banarjee ,  
Prentice – Hall of India Pvt. Ltd

**B.Tech. I Year (common to all branches)**

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**ENGINEERING CHEMISTRY**

**UNIT I: Water:** Sources of Water, Types of impurities in Water, Hardness of Water – Temporary and Permanent hardness. Units. Estimation of hardness by EDTA Method. Analysis of Water - Dissolved Oxygen. Disadvantages of Hard Water. Problems on hardness of water. Methods of Treatment of Water for Domestic Purpose – Sterilisation: Chlorination, Ozonisation.

**Water for Industrial purpose** - Water for Steam Making, Boiler Troubles – Carry Over (Priming and Foaming), Boiler Corrosion, Scales and Sludge, Caustic Embrittlement. Water Treatment: - Internal Treatment – Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates Conditioning of Water. External Treatment - Ion- Exchange Process; Demineralization of Brakish Water – Reverse Osmosis.

**UNIT II: Science of Corrosion:** Definition, Types of corrosion: Dry Corrosion, (Direct Chemical attack), Wet Corrosion, Theories of Corrosion and Mechanism, Electro Chemical Theory of Corrosion. Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Oxygen absorption type. Factors Influencing Corrosion. Control of Corrosion – Cathodic Protection – Sacrificial anode and Impressed Current. Uses of Inhibitors. Electro Plating, and Electro less plating (copper and nickel)

**UNIT III: Polymers:** Polymerization Reactions – Basic concepts. Types of Polymerization – Addition and Condensation Polymerization. Plastics –Thermosetting and Thermoplastics. Composition, Properties and Engineering Uses of the Following: Teflon, Bakelite, Nylon. Rubber – Processing of Natural Rubber and Compounding. Elastomers – Buna S, Buna N, Polyurethane Rubber; Silicone Rubber. Conducting Polymers, Synthesis and applications of Polyacetylene and Poly aniline  
Liquid Crystals definition, properties, suitable examples and Engineering Applications

**UNIT IV: Chemistry of nano materials:** Nano materials definition, properties and applications;  
**Explosives and Propellants:** Explosives, Classification, precautions during storage, blasting fuses, important explosives. Rocket propellants, classification of propellants.  
**Lubricants :**Principles and function of lubricants - Classification and properties of lubricants – Viscosity, flash and fire points, cloud and pour points, aniline point, Neutralisation Number and Mechanical Strength.

**UNIT V: Electro Chemistry:** Conductance – Equivalent Conductance – Molecular Conductance, Conductometric Titrations – Applications of Conductivity Measurements.

**Electrochemical Cells:** Measurement of EMF, Standard electrode potential, concentration cells, batteries (Ni–Cd cell), Lithium batteries. Fuel cell: hydrogen oxygen fuel cell and methanol fuel cell

**Insulators** – Definition, Properties and Characteristics of Insulating Materials; Engineering Applications.

**UNIT VI: Phase rule:** Definition, Terms involved in Phase Rule and Phase rule equation. Phase diagrams – one component system (water system), two component system (lead- silver system) Eutectics, heat treatment based on iron-carbon phase diagram, hardening, annealing.

**UNIT VII: Fuels and Combustion:** Definition and Classification of fuels. Solid, liquid & gaseous fuels, Characteristics of a good fuel. Metallurgical Coke – Characteristics & Manufacture ( Otto-Halfmann). Petroleum – Refining – Synthetic Petrol. Calorific Value & its determination ( Bomb Calorimeter – Junker’s Gas Calorimeter). Combustion: Flue gas analysis by Orsat’s apparatus.

**UNIT VIII: Building Materials:** Cement: composition of Portland cement, analysis, setting and hardening of cement (reactions).

**Refractories :** Definition, Classification With Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material

**TEXT BOOKS:**

1. Chemistry for Engineers Prof. K.N.Jayaveera, Dr.G.V.Subba Reddy and Dr.C. Ramachandraiah, McGraw Hill Higher Education Hyd., 2009
2. A text book of Engineering Chemistry by S.S. Dara, S.Chand & Co, New Delhi (2008)
3. Text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, 15th edition New Delhi (2008).

**REFERENCE:**

1. Engineering Chemistry Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, Scitech Publications(India) Pvt. Limited, Hyderabad. 2009
2. Fuel Cells principles and applications by B.Viswanath, M.Aulice Scibioh-Universities press
3. Chemistry of Engineering Materials by C.V. Agarwal, Tara Publication, Varanasi.2008
4. Physical Chemistry - Glasston & Lewis.
5. Engineering Chemistry (Vol.1&2) by J C Kuriacose and J. Rajaram, Tata McGraw-Hill Co, New Delhi (2004)
6. Applied Chemistry: A Text Book for chemistry for Engineers & Technologists, G.D. Gesser, Springer, 2000

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<b>3+1</b>	<b>6</b>

**MATHEMATICS – I**

**UNIT I**– Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications: to Newton’s law of cooling, law of natural growth and decay, orthogonal trajectories.

**UNIT II**– Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $x$ ,  $e^{ax} V(x)$ ,  $xV(x)$ , method of variation of parameters.

**UNIT III**– Rolle’s Theorem – Lagrange’s Mean Value Theorem – (excluding proof). Simple examples of Taylor’s and Maclaurin’s Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

**UNIT – IV**

Raidus of Curvature – Curve tracing – Cartesian, polar and parametric curves. Applications of integration to lengths, volume and surface area of solids of revolution in Cartesian and polar coordinates

**UNIT V**– Multiple integral: – Double and triple integrals – Change of Variables – Change of order of integration.

**UNIT VI**– 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 – Laplace transform of Periodic function.

**UNIT VII**– Differentiation and integration of Laplace transform – Application of Laplace transforms to ordinary differential equations of first and second order.

**UNIT VIII**– Vector Calculus: Gradient – Divergence – Curl and Their properties; Vector integration – Line integral - Potential function – Area , Surface and volume integrals. Vector integral theorems: Green’s theorem – Stoke’s and Gauss’s Divergence Theorem (excluding their proof). Verification of Green’s–Stoke’s and Gauss’s Theorems.

**TEXT BOOKS:**

1. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A Text Book of Engineering Mathematics, C. Sankaraiah, V.G.S. Book Links.
3. A Text Book of Engineering Mathematics-1, E. Rukmangadachari, E. Keshava Reddy, Pearson Education.

**REFERENCES:**

1. A Text Book of Engineering Mathematics, B.V. Ramana, Tata Mc Graw Hill.
2. A Text Book of Engineering Mathematics, Thomson Book Collection.
3. A Text Book of Advanced Engineering Mathematics – A Computer Approach, N.Bail, M.Goyal & C. Watkins.
4. Engineering Mathematics, Sarveswara Rao Koneru, Universities Press.

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<b>T</b>	<b>C</b>
<b>3+1</b>	<b>6</b>

### **PROGRAMMING IN C AND DATA STRUCTURES**

**Unit I-** Overview of Computers and Programming - Electronic Computers then and Now, Computer Hardware, Computer Software, Algorithm, Flowcharts, Software Development Method, Applying the Software Development Method.

**Unit II-** Introduction to C Language - C Language Elements, Variable Declarations and Data Types, Executable Statements, General Form of a C Program, Expressions, Precedence and Associativity, Expression Evaluation, Operators and Expressions, Type Conversions, Decision Statements - If and Switch Statements, Loop Control Statements - while, for, do-while Statements, Nested for Loops, Other Related Statements -break, continue, goto.

**Unit III-** Functions - Library Functions, Top-Down Design and Structure Charts, Functions with and without Arguments, Communications Among Functions, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands. Arrays - Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Using Array Elements as Function Arguments, Arrays Arguments, Multidimensional Arrays.

**Unit IV-** Pointers - Introduction, Features of Pointers, Pointer Declaration, Arithmetic Operations With Pointers, Pointers and Arrays, Pointers and Two-Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Memory Allocation Functions, Programming Applications, Pointer to Functions, Command- Line Arguments.

Strings - String Basics, String Library Functions, Longer Strings, String Comparison, Arrays of Pointers, Character operations, String-To-Number and Number-To- String Conversions, Pointers and Strings.

**Unit V-** Structure and Union – Introduction, Features of Structures. Declaration and Initialization of Structures, Structure within Structure, Array of Structures, Pointer to Structure, Structure and Functions, typedef, Bit Fields, Enumerated Data Type, Union, Union of Structures.

**Unit VI-** Files - Introduction, Streams and File Types, Steps for File Operations, File I/O Structures, Read and Write, Other File function, Searching Errors in Reading/Writing of Files, Low Level Disk I/O, Command Line Arguments, Application of Command Line Arguments, File Status functions (error handling).

**Unit VII-** Data Structures - Overview of Data Structure, Representation of a Stack, Stack Related Terms, Operation on a Stack, Implementation of a Stack, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Conversion of Expression from Infix to Postfix, Recursion, Queues - Various Positions of Queue, Representation of Queue, Insertion, Deletion, Searching Operations.

Linked List - Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

**Unit VIII-** Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort. Searching- Linear and Binary Search Methods.

#### **TEXT BOOKS :**

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education
2. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

**REFERENCES :**

1. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. C and Data Structures, a snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand
4. C and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill
5. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.

**B.Tech. I Year (common to all branches)**

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**6**      **6**

**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:

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloids and Hypocycloid
- c) Involute.
- d) Helices

**UNIT II– PROJECTION OF POINTS AND LINES:** Principles of Orthographic Projection – Conventions – First and Third Angle Projections. Projections of Points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces only.

**UNIT III– PROJECTIONS OF PLANES:** Projections of regular Plane surfaces/figures, Projection of lines and planes using auxiliary planes.

**UNIT IV– PROJECTIONS OF SOLIDS:** Projections of Regular Solids inclined to one or both planes – Auxiliary Views.

**UNIT V– SECTIONS AND DEVELOPMENTS OF SOLIDS:** Section Planes and Sectional views of Right Regular Solids–Prism, Cylinder, Pyramid and Cone. True shapes of the sections.

Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid, Cone and their Sectional parts.

**UNIT VI– ISOMETRIC AND ORTHOGRAPHIC 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 projections of spherical parts.

Conversion of Isometric projections/views to Orthographic Views – Conventions.

**UNIT VII– INTERPENETRATION OF RIGHT REGULAR SOLIDS:** Projections of curves of Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Square Prism Vs Square Prism.

**UNIT VIII– PERSPECTIVE PROJECTIONS:** Perspective View of Plane Figures and Simple Solids. Vanishing Point Method (General Methods only).

**TEXT BOOKS:**

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, Johle, Tata McGraw-Hill
3. Engineering Drawing, Shah and Rana, 2/e, Pearson education

**REFERENCES:**

1. Engineering Drawing and Graphics, Venugopal/ New age
2. Engineering Drawing, B.V.R. Guptha, J.K. Publishesrs
3. Engineering Drawing, K.L. Narayana, P. Khanniah, Scitech Pub
4. Engineering Drawing, Venkata Reddy, B.S.Publishers.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

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<b>P</b>	<b>C</b>
<b>3</b>	<b>4</b>

**PROGRAMMING IN C AND DATA STRUCTURES 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 with ANSI C Compiler and Supporting Editors

**Exercise 1.**

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

**Exercise 2.**

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

**Exercise 3**

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

**Exercise 4**

- a) The total distance travelled by vehicle in 't' seconds is given by distance  $S = ut + 1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>) respectively. 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'.
- b) 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)

**Exercise 5**

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

**Exercise 6**

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

**Exercise 7**

- a) 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.

b) Write a C program to count the lines, words and characters in a given text.

### Exercise 8

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

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

### Exercise 9

Write a C program to read in two numbers, x and n, and then compute the sum of the 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. Find if any values of x are also illegal? If so, test for them too.

### Exercise 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.

### Exercise 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.)

### Exercise 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.)

### Exercise 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)

### Exercise 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

### Exercise 15

Write C programs that implement stack (its operations) using

- i) Arrays    ii) Pointers

### Exercise 16

Write C programs that implement Queue (its operations) using

- i) Arrays    ii) Pointers

### Exercise 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

### Exercise 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

**Exercise 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

**Exercise 20**

Write C program that implements the Quick sort method to sort a given list of integers in ascending order.

**Exercise 21**

Write C program that implement the Merge sort method to sort a given list of integers in ascending order.

**Exercise 22**

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

**Exercise 23**

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

**Exercise 24**

Write C programs to implement Trapezoidal and Simpson methods.

**REFERENCE BOOKS**

1. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

**B.Tech. I Year (common to all branches)**

**P      C**  
**3      4**

**ENGINEERING AND IT WORKSHOP**

**ENGINEERING WORKSHOP**

**Objectives:** The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

**1. TRADES FOR EXERCISES:**

- a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue:  
Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock
- b. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock
- b. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet
- c. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
- d. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.
- e. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

**2. TRADES FOR DEMONSTRATION:**

- a. Plumbing
- b. Machine Shop
- c. Metal Cutting

**Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.**

**REFERENCE BOOKS:**

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

## IT WORKSHOP

### Objectives:

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

**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 a working PC (PIV or higher) to disassemble and assemble back 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 for 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, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX. **(It is recommended to use Microsoft office 2007 in place of MS Office 2003)**

### PC Hardware

**Exercise 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.

**Exercise 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 shall be given as part of the course content.

**Exercise 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.

**Exercise 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

**Exercise 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

**Exercise 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.

## OFFICE TOOLS

### LaTeX and Word

**Exercise 7 – 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 four 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 in word.

**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.

## Excel

**Exercise 8 - 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 four 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

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

**Exercise 9 - Task1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Exercise 10 - Task 2 :** Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

## Internet & World Wide Web Exercises

2

**Exercise 11 - 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.

**Web Browsers, Surfing the Web:** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

**Exercise 12 - Task 2: 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 by the student to the satisfaction of instructors.

**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.

## 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.

B.Tech. I Year (common to all branches)

P C  
3/2 2

**ENGINEERING PHYSICS LAB**

Any **TEN** of the following experiments are to be performed during the Academic year.

Sl.No.	Name of the Experiment
1.	Determination of wavelength of given source – spectrometer – normal incidence method.
2.	Dispersive power of the prism – Spectrometer.
3.	Determination of wavelength of a laser source - Diffraction Grating.
4.	Determination of particle size by using a laser source.
5.	Determination of thickness of a thin wire using parallel fringes.
6.	Newton’s Rings.
7.	Magnetic field along the axis of a current carrying coil – Stewart and Gee’s method.
8.	Numerical aperture of an optical fiber.
9.	Hall effect.
10.	B – H Curve.
11.	Energy gap of a material of p-n junction
12.	Determination of rigidity modulus of a wire material – Torsional pendulum
13.	Determination of dielectric constant.
14.	Verification of laws of stretched string – Sonometer.
15.	Melde’s experiment – Transverse & Longitudinal modes.

Equipment required:

Spectrometer, Grating, Prism, Mercury vapour lamp, Sodium vapour lamp, Travelling Microscope, Wedge arrangement, Newton rings setup, Stewart-Gee’s apparatus, He-Ne laser source, Optical fiber, Hall effect kit, B-H loop kit, Energy gap kit (four probe method), Torsional pendulum, Dielectric constant kit, Sonometer, Melde’s apparatus

**ENGINEERING CHEMISTRY LAB**

1. Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron.
2. Preparation of Standard Potassium Dichromate and Estimation of Copper, by Iodometry.
3. Preparation of Standard EDTA solution and Estimation of Hardness of Water.
4. Preparation of Standard EDTA and Estimation of Copper
5. Determination of Manganese in Steel and Iron in Cement.
6. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide solution by Conductometric titration
7. Determination of viscosity of the oils through Redwood viscometer
8. Determination of calorific value of fuel using Bomb calorimeter
9. Estimation of dissolved oxygen
10. Determination of Eutectic Temperature of binary system (Urea – Benzoic Acid)

**BOOKS:**

1. Chemistry-lab manual by Dr K.N.Jayaveera and K.B. Chandra Sekhar, S.M. Enterprises Ltd.
2. Vogel's Book of Quantitative Inorganic Analysis, ELBS Edition.

**Equipment Required:**

1. Glass ware: Pipettes, Burettes, Volumetric Flasks, Beakers, Standard flasks, Measuring jars, Boiling Test tubes, reagent bottles, (Borosil)
2. Analytical balance (kero) (15 Nos)
3. Calorimeter
4. Bomb Calorimeter
5. Redwood viscometer No.1& No.2
6. Conductometer/ Conductivity bridge
7. Wash bottles, test tube stands, burette stands
8. Gas cylinders with Bunsen burners
9. Chemicals: Hydrochloric acid, sodiumhydroxide, EDTA, EBT indicator, fast sulfon black-f, urea, benzoic acid, methanol, Mohr's salt, copper sulphate, magnesium sulphate, ammonia, ammonium sulphate, calcium sulphate etc.,

**B.Tech. I Year (common to all branches)**

**P C**  
**3 4**

**ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB**

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

**Objectives:**

- 1. To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills**
- 2. To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning**
- 3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm**
- 4. To initiate them into greater use of the computer in resume preparation, report- writing, format-making etc.**
- 5. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required ability to face computer-based competitive exams such GRE, TOEFL, GMAT 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 (giving directions etc.)
4. Speaking on the mobiles and telephone conversation
5. Role Play.
6. Oral Presentations- Prepared and Extempore.
7. 'Just A Minute' Sessions (JAM).
8. Describing Objects / Situations / People.
9. Information Transfer
10. Debate

**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**

**PRESCRIBED SOFTWARE: GLOBARENA**

**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
  - Learning to Speak English - 4 CDs
  - Microsoft Encarta with CD
- 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. **English Pronouncing Dictionary**, Daniel Jones Current Edition with CD.
2. **Spoken English**, R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
3. **Speaking English Effectively**, Krishna Mohan & NP Singh (Macmillan)
4. **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.
5. **Body Language- Your Success Mantra**, Dr Shalini Verma, S.Chand & Co, 2008
6. **English Dictionary for Advanced Learners**, ( with CD ) International edn. Macmillan 2009
7. **A Handbook for English language Laboratories**, E.Sureshkumar, P.Sreehari, Foundation Books, 2009
8. **DELTA's key to the Next Generation TOEFL Test**, 6 audio CDS, New Age International Publishers, 2007

**B.Tech. I Year (Common for E.C.E., E.E.E., E.I.E., C.S.E., I.T., C.S.S.E., E.Cont.E., E.C.M.)**

**P C**  
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**MATHEMATICAL METHODS**

**UNIT I– Matrices:** Elementary row transformations – Rank – Echelon form, normal form – Solution of Linear System of Homogenous and Non Homogeneous equations – Direct Methods – Gauss Elimination, Gauss Jordan methods.

Eigen Values, Eigen vectors – Properties. Cayley – Hamilton Theorem – Inverse and powers of a matrix by Cayley–Hamilton theorem – Diagonalization of matrix. Calculation of powers of matrix.

**UNIT II–** Real matrices – Symmetric, skew – Symmetric, orthogonal matrices. Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian, Unitary matrices –and their properties. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

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

**Interpolation:** Introduction – Finite differences – Forward Differences – backward Differences – Newton’s forward and backward difference formulae for interpolation – Lagrange’s Interpolation formula.

**UNIT IV–** Curve fitting: Fitting a straight line – Second degree curve – Exponential curve-Power curve by method of least squares. Numerical Differentiation and Integration – Trapezoidal rule – Simpson’s 1/3 Rule – Simpson’s 3/8 Rule.

**UNIT V–** Numerical solution of Ordinary Differential equations: Solution by Taylor’s series-Euler’s Method-Runge-Kutta Methods – Milne’s Predictor-Corrector Method.

**UNIT VI–** Fourier Series: Determination of Fourier coefficients – Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions. Fourier integral theorem (statement only) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

**UNIT – VII**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace equation under initial and boundary conditions.

**UNIT VIII–** z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

**TEXT BOOKS:**

1. Mathematical Methods, T.K.V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. Mathematical Methods, C. Sankaraiah, V.G.S. Book Links.
3. Mathematical Methods, G. Shanker Rao, E. Keshava Reddy, I. K. International Publishing House Pvt. Ltd.

**REFERENCES:**

1. Numerical Methods for Scientific and Engineering Computation , M.K. Jain, S.R.K. Iyengar & R.K. Jain, New Age international Publishers.
2. Mathematical Methods – Pal – Oxford.
3. Introduction to Numerical Analysis – S.S. Sastry Printice Hall of India
4. Mathematical Methods, S.K.V.S. Sri Ramachary, M. Bhujanga Rao, P.B. Bhaskar Rao & P.S. Subramanyam, BS Publications.

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

**B.Tech. I Year (common for M.E., C.E, Bio-Tech., Aero.E)**

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**3+1 6**

## **ENGINEERING MECHANICS**

**UNIT I– BASIC CONCEPTS** - System of forces– Moment of forces and its Application – Couples and Resultant of Force System

**EQUILIBRIUM OF SYSTEM OF FORCES:** Free body diagrams –Types of Supports – Support reactions for beams with different types of loading – concentrated, uniformly distributed and uniformly varying loading.

**UNIT II– ANALYSIS OF PERFECT FRAMES:** Types of frames – cantilever frames and simply supported frames – Analysis of frames using method of joints, Tension Coefficient method and methods of sections for vertical loads, horizontal loads and inclined loads.

**UNIT III– FRICTION:** Types of friction– laws of Friction–Limiting friction–Cone of limiting friction–static and Dynamic Frictions – Motion of bodies – Wedge, Screw jack and differential Screw jack.

**UNIT IV– CENTROID AND CENTER OF GRAVITY:** Centroids of simple figures – Centroids of Composite figures – Centre of Gravity of bodies – Centre of Gravity of Composite figures. (Simple problems only).

**UNIT V– AREA MOMENT OF INERTIA** - Parallel axis and perpendicular axis theorems - Moments of Inertia of Composite Figures

**MASS MOMENT OF INERTIA:** Moment of Inertia of Simple solids, Moment of Inertia of composite masses.( Simple problems only)

**UNIT VI– KINEMATICS :** Rectilinear and Curve linear motion – Velocity and Acceleration – Motion of A Rigid Body – Types and their Analysis in Planar Motion.

**UNIT VII– KINETICS :** Analysis as particles and Analysis as a Rigid Body in Translation – Central Forces of motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies – Work Energy Method – Equation for Translation – Work – Energy application to Particle Motion, Connection System – Fixed axis Rotation and Plane Motion.

**UNIT VIII– MECHANICAL VIBRATIONS:** Definitions, Concepts. Simple harmonic motion. Free vibrations. Simple, Compound and Torsional pendulums- Numerical problems

### **TEXT BOOKS:**

- (1) Engineering Mechanics, Shames & Rao – Pearson Education.
- (2) Engineering Mechanics, Fedrinand L.Singer – B.S. Publishers.
- (3) Engineering Mechanics, Bhavikatti and Rajasekharappa

### **REFERENCES:**

- (1) Engineering Mechanics-Statics and dynamics, A.Nelson, Tata MCGraw-Hill Company
- (2) Mechanics of Materials by Timoshenko & Gere, CBS
- (3) Engineering Mechanics – B. Bhathacharya- Oxford University Publications
- (4) Mechanics of Materials - Dr. B. C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publication
- (5) Engineering Mechanics –Arthur P. Boreasi and Richard J. Schmidt. – Brooks/Cole – Cengage Learning

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

**B.Tech. I Year for Bio-Tech for MPC stream students**

## **ESSENTIALS OF BIOTECHNOLOGY**

**(Audit Course)**

### **UNIT I: INTRODUCTION TO MICRO ORGANISMS**

Diversity in Biological systems, Cell biology and cell structure, Difference between Prokaryotes & Eukaryotes. Kingdom systems. Five-kingdom classification, General characters & Brief account of microorganisms.

### **UNIT II: PLANT & ANIMAL BIOLOGY**

Classification of Plant Kingdom & economic Importance of Plants.

Classification of Animal Kingdom & economic importance.

### **UNIT III: HUMAN BIOLOGY**

Introduction of body as a whole, Cells and Tissue Organization. Biological axons, neurons and nervous system.

### **UNIT IV : MOLECULAR BIOLOGY AND BIOTECHNOLOGY: BASIC CONCEPTS**

Structure of DNA, RNA and Primary structure of proteins. Brief account of central dogma, applications of r-DNA technology-Insulin, introduction to transgenic plants and animals.

### **TEXT BOOKS:**

1. Biotechnology Volume I & 2, H.G. Rehm and G.Reed,
2. A text book of Biotechnology, R.C.Dubey, S.Chand (1993)
3. Concepts of Biotechnology, D.Balasubramanyam et.al., University Press.

Note: attendance and internal exams shall be conducted and satisfactory report of the head of the department shall to be obtained and recorded.