



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**  
**(Established by Govt. of A.P., Act. No. 30 of 2008)**  
**ANANTHAPURAMU – 515 002 (A.P) INDIA**

**Course Structure for B.Tech. - R15 Regulations**

**INFORMATION TECHNOLOGY**

**I-II Semester**

S.No	Course code	Subject	Th	Tu/Drg/Lab	Credits
1.	15A52201	English for Professional Communication	3	1 - -	3
2.	15A54201	Mathematics – II	3	1 - -	3
3.	15A05201	Data Structures	3	1 - -	3
4.	15A56101	Engineering Physics	3	1 - -	3
5.	15A03101	Engineering Drawing	0	- 6 -	3
6.	15A05202	Data Structures Lab	-	- - 4	2
7.	15A56102	Engineering Physics Lab	-	- - 4	2
8.	15A99201	Engineering & IT Workshop	-	- - 4	2
			12	4 6 12	21

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ANANTHAPURAMU**

**B.Tech. I - II Sem. (IT)**

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<b>3</b>	<b>1</b>	<b>3</b>

**(15A52201) ENGLISH FOR PROFESSIONAL COMMUNICATION**

**1. INTRODUCTION:**

English is a global language and has international appeal and application. It is widely used in a variety of contexts and for varied purposes. The students would find it useful both for social and professional development. There is every need to help the students acquire skills useful to them in their career as well as workplace. They need to write a variety of documents and letters now extending into professional domain that cuts across business and research also. The syllabus has been designed to enhance communication skills of the students of engineering and pharmacy. The prescribed book serves the purpose of preparing them for everyday communication and to face the global competitions in future.

The text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and learner-centered. They should be encouraged to participate in the classroom activities keenly.

In addition to the exercises from the text done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

**2. OBJECTIVES:**

1. To develop confidence in the students to use English in everyday situations.
2. To enable the students to read different discourses so that they appreciate English for science and technologies.
3. To improve familiarity with a variety of technical writings.
4. To enable the students to acquire structure and written expressions required for their profession.
5. To develop the listening skills of the students.

**3. SYLLABUS:****UNIT –I**

**Topics:** Group discussion, cause and effect, events and perspectives, debate, if conditional, essay writing.

**Text:** **LESSONS FROM THE PAST** from *MINDSCAPES*

Importance of History - Differing Perspectives - Modern Corporatism -  
Lessons From The Past

## UNIT-II

**Topics:** Idioms, essay writing, power point presentation, modals, listening and rewriting, preparing summary, debate, group discussion, role play, writing a book review, conversation

**Text: 'ENERGY' from *MINDSCAPES***

Renewable and Non-Renewable Sources - Alternative Sources -Conservation -Nuclear Energy

## UNIT-III

**Topics:** Vocabulary, impromptu speech, creative writing, direct and indirect speech, fixed expressions, developing creative writing skills, accents, presentation skills, making posters, report writing

**Text: 'ENGINEERING ETHICS' from *MINDSCAPES***

Challenger Disaster - Biotechnology - Genetic Engineering - Protection From Natural Calamities

## UNIT-IV

**Topics:** Vocabulary, Conversation, Collocation, Group discussion, Note-making, Clauses, Interpreting charts and tables, Report writing.

**Text: 'TRAVEL AND TOURISM' from *MINDSCAPES***

Advantages and Disadvantages of Travel - Tourism - Atithi Devo Bhava - Tourism in India

## UNIT-V

**Topics:** Vocabulary, phrasal verbs, writing a profile, connectives, discourse markers, problem-solving, telephone skills, application letters, curriculum vitae, interviews (telephone and personal)

**Text: 'GETTING JOB-READY' from *MINDSCAPES***

SWOT Analysis - Companies And Ways Of Powering Growth - Preparing For Interviews

### Prescribed Text

***MINDSCAPES***: English for Technologists and Engineers, Orient Blackswan, 2014.

**REFERENCES:**

1. **Effective Tech Communication**, [Rizvi](#), Tata McGraw-Hill Education, 2007.
2. **Technical Communication**, Meenakshi Raman, Oxford University Press.
3. **English Conversations Practice**, Grant Taylor, Tata Mc GrawHill publications, 2013.
4. **Practical English Grammar**. Thomson and Martinet, OUP, 2010.

**Expected Outcomes:**

At the end of the course, students would be expected to:

1. Have acquired ability to participate effectively in group discussions.
2. Have developed ability in writing in various contexts.
3. Have acquired a proper level of competence for employability.

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**(15A54201) MATHEMATICS – II  
(Common to All Branches)**

**Objectives:** Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and solution of partial differential equations.

**UNIT – I**

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.

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

**UNIT – II**

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- Parseval's formula- Complex form of Fourier series.

**UNIT – III**

Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

**UNIT – IV**

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's equation under initial and boundary conditions.

**UNIT – V**

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. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.

**REFERENCES:**

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

**Outcomes:**The student gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.

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**(15A05201) DATA STRUCTURES  
(Common to CSE and IT branches of Engineering)**

**Objectives:**

- Understand different Data Structures
- Understand Searching and Sorting techniques

**Unit-1**

**Introduction and overview:** Asymptotic Notations, One Dimensional array- Multi Dimensional array- pointer arrays.

**Linked lists:** Definition- Single linked list- Circular linked list- Double linked list- Circular Double linked list- Application of linked lists.

**Unit-2**

**Stacks:** Introduction-Definition-Representation of Stack-Operations on Stacks- Applications of Stacks.

**Queues:** Introduction, Definition- Representations of Queues- Various Queue Structures- Applications of Queues. **Tables:** Hash tables.

**Unit-3**

**Trees:** Basic Terminologies- Definition and Concepts- Representations of Binary Tree- Operation on a Binary Tree- Types of Binary Trees-Binary Search Tree, Heap Trees, Height Balanced Trees, B. Trees, Red Black Trees.

**Graphs:** Introduction- Graph terminologies- Representation of graphs- Operations on Graphs- Application of Graph Structures: Shortest path problem- topological sorting.

**Unit-4**

**Sorting :** Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort- Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort- Sorting by Exchange- Bubble Sort- Shell Sort- Quick Sort-External Sorts: Merging Order Files-Merging Unorder Files- Sorting Process.

**Unit-5**

**Searching:** List Searches- Sequential Search- Variations on Sequential Searches- Binary Search- Analyzing Search Algorithm- Hashed List Searches- Basic Concepts- Hashing Methods- Collision Resolutions- Open Addressing- Linked List Collision Resolution- Bucket Hashing.

**Text Books:**

1. "Classic Data Structures", Second Edition by Debasis Samanta, PHI.
2. "Data Structures A Pseudo code Approach with C", Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning.

**Reference Books:**

1. Fundamentals of Data Structures in C – Horowitz, Sahni, Anderson-Freed, Universities Press, Second Edition.
2. Schaum' Outlines – Data Structures – Seymour Lipschutz – McGrawHill- Revised First Edition.
3. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

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**(15A56101) ENGINEERING PHYSICS**

**Objectives:**

- To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.
- To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays and non-destructive evaluation using ultrasonic techniques.
- To get an insight into the microscopic meaning of conductivity , classical and quantum free electron model, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials and to understand electron transport mechanism in solids.
- To open new avenues of knowledge and understanding semiconductor based electronic devices , basic concepts and applications of semiconductors and magnetic materials have been introduced which find potential in the emerging micro device applications.
- To give an impetus on the subtle mechanism of superconductors in terms of conduction of electron pairs using BCS theory, different properties exhibited by them and their fascinating applications. Considering the significance of microminiaturization of electronic devices and significance of low dimensional materials, the basic concepts of nanomaterials, their synthesis, properties and applications in emerging technologies are elicited.

**UNIT - I****PHYSICAL OPTICS, LASERS AND FIBRE OPTICS**

*Physical Optics:* Interference (Review) – Interference in thin film by reflection –Newton's rings –Diffraction (Review) - Fraunhofer diffraction due to single slit, double slit and diffraction grating.

*Lasers:* Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein's coefficients — Population inversion – Excitation mechanism and optical resonator – Nd:YAG laser - He-Ne laser – Semiconductor Diode laser - Applications of lasers

*Fiber optics:* Introduction - construction and working principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers – Attenuation and losses in Optical fibers –Block diagram of Optical fiber communication system – Applications of optical fibers

## **UNIT – II**

### **CRYSTALLOGRAPHY AND ULTRASONICS**

*Crystallography:* Introduction – Space lattice – Unit cell – Lattice parameters – Bravais lattice – Crystal systems – Packing fractions of SC, BCC and FCC – Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction – Bragg's law – Powder method.

*Ultrasonics:* Introduction – Production of ultrasonics by piezoelectric method – Properties and detection – Applications in non-destructive testing.

## **UNIT – III**

### **QUANTUM MECHANICS AND ELECTRON THEORY**

*Quantum Mechanics:* Matter waves – de Broglie hypothesis and properties – Schrodinger's time dependent and independent wave equations – Physical significance of wave function – Particle in one dimensional infinite potential well.

*Electron theory:* Classical free electron theory – Equation for electrical conductivity – Quantum free electron theory – Fermi-Dirac distribution – Source of electrical resistance – Kronig-Penny model (qualitative treatment) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

## **UNIT – IV**

### **SEMICONDUCTORS AND MAGNETIC MATERIALS**

*Semiconductors:* Intrinsic and extrinsic semiconductors (Qualitative treatment) – Drift & diffusion currents and Einstein's equation – Hall effect – Direct and indirect band gap semiconductors – Formation of p-n junction.

*Magnetic materials:* Introduction and basic definitions – Origin of magnetic moments – Bohr magneton – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials (Qualitative treatment) – Hysteresis – Soft and hard magnetic materials, applications of magnetic materials.

## **UNIT – V**

### **SUPERCONDUCTIVITY AND PHYSICS OF NANOMATERIALS**

*Superconductivity:* Introduction – Effect of magnetic field – Meissner effect – Type I and Type II superconductors – Flux quantization – Penetration depth – BCS theory (qualitative treatment) – Josephson effects – Applications of superconductors.

*Physics of Nanomaterials:* Introduction – Significance of nanoscale and types of nanomaterials – Physical properties: optical, thermal, mechanical and magnetic properties – Synthesis of nanomaterials by Top down and bottom up approaches: ball mill, chemical vapour deposition, and sol gel – Applications of nanomaterials.

### **Text Books:**

1. Engineering Physics – K.Thyagarajan, 5<sup>th</sup> Edition, MacGraw Hill Publishers, NewDelhi, 2014.
2. Physics for Engineers – N.K Verma, 1<sup>st</sup> Edition, PHI Learning Private Limited, New Delhi, 2014.

**References:**

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, 10<sup>th</sup> Edition, S.Chand and Company, New Delhi, 2014.
2. Engineering Physics – D K Pandey, S. Chaturvedi, 2<sup>nd</sup> Edition, Cengage Learning, New Delhi, 2013.
3. Engineering Physics – D.K Bhattacharya, Poonam Tandon, 1<sup>nd</sup> Edition, Oxford University Press, New Delhi, 2015.

**Outcomes:**

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques.
- The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting and magnetic materials are illustrated.

The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

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**B.Tech. I - II Sem. (IT)**

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**(15A03101) ENGINEERING DRAWING**

**Objectives:**

- To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
- To learn about various projections, to understand complete dimensions and details of object.
- Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

**UNIT I**

**Introduction to Engineering Drawing:** Principles of Engineering Graphics and their Significance- Conventions in Drawing-Lettering – BIS Conventions. Curves used in Engineering Practice. a) Conic Sections including the Rectangular Hyperbola- General method only, b) Cycloid, Epicycloid and Hypocycloid

**UNIT II**

**Scales:** Plain, Diagonal and Vernier;

**Projection of Points:** Principles of orthographic projection – Convention – First angle projections, projections of points.

**UNIT III**

**Projections of Lines:** lines inclined to one or both planes, Problems on projections, Finding True lengths.

**Projections of Planes:** Projections of regular plane surfaces- plane surfaces inclined to both planes.

**UNIT IV**

**Projections of Solids:** Projections of Regular Solids with axis inclined to both planes.

**Developments of Solids:** Development of Surfaces of Right Regular Solids- Prism, Cylinder, Pyramid, Cone.

**UNIT V**

**Isometric and Orthographic Projections:** Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

**Text Books:**

1. *Engineering Drawing*, N.D. Bhatt, Charotar Publishers
2. *Engineering Drawing*, K.L. Narayana & P. Kannaih, Scitech Publishers, Chennai

**References:**

1. *Engineering Drawing*, Johle, Tata McGraw-Hill Publishers
2. *Engineering Drawing*, Shah and Rana, 2/e, Pearson Education
3. *Engineering Drawing and Graphics*, Venugopal/New age Publishers
4. *Engineering Graphics*, K.C. John, PHI, 2013
5. *Engineering Drawing*, B.V.R. Gupta, J.K. Publishers

**Outcomes:**

- Drawing 2D and 3D diagrams of various objects.
- Learning conventions of Drawing, which is an Universal Language of Engineers.
- Drafting projections of points, planes and solids.

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**(15A05202) DATA STRUCTURES LAB  
(Common to CSE & IT Branches of Engineering)**

**Course Objectives:**

- To strengthen the ability to identify and apply the suitable data structure for the given real world problem

**Course Outcomes:**

- Apply problem solving techniques to find solutions to problems
- Able to identify the appropriate data structure for a given problem or application.
- Improve logical skills

**List of Experiments/Tasks**

1. Write a program to sort the elements of an array using sorting by exchange.
2. Write a program to sort the elements of an array using Selection Sort.
3. Write a program to implement heap sort.
4. Write a program to perform Linear Search on the elements of a given array.
5. Write a program to perform Binary Search on the elements of a given array.
6. Write a program to convert infix expression to postfix expression and evaluate postfix expression.
7. Write a program to implement stack, queue, circular queue using arrays and linked lists.
8. Write a program to perform the operations creation, insertion, deletion, and traversing a singly linked list.
9. Write a program to perform the operations creation, insertion, deletion, and traversing a Doubly linked list.
10. Write a program to remove duplicates from ordered and unordered arrays.
11. Write a program to sort numbers using insertion sort.

12. Write a program to implement quick sort using non-recursive and recursive approaches. Use randomized element as partitioning element.
13. Write a program to search a word in a given file and display all its positions.
14. Write a program for tic-tac-toe game.
15. Write a program to perform operations creation, insertion, deletion and traversing on a binary search tree.
16. Write a program to implement depth first search and breadth first search on graphs.
17. Write a program to perform different operations on Red Black trees.
18. Write a program to implement external sorting.
19. Write a program to perform different operations of B Tree.

**Note:**

1. Instructors are advised to conduct the lab in LINUX/UNIX environment
2. The above list consists of only sample programs. Instructors may choose other programs to illustrate certain concepts, wherever is necessary. Programs should be there on all the concepts studied in Theory. Instructors are advised to change atleast 25% of the programs every year until the next syllabus revision.

**References:**

1. Fundamentals of Data Structures in C”, Horowitz, Sahni, Anderson-freed, Second Edition, Universities Press.
2. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

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**(15A56102) ENGINEERING PHYSICS LABORATORY**

**Objectives:**

- Will recognize the important of optical phenomenon like Interference and diffraction.
- Will understand the role of optical fiber parameters and signal losses in communication.
- Will recognize the importance of energy gap in the study of conductivity and hall effect in a semiconductor
- Will understand the applications of B H curve.
- Will acquire a practical knowledge of studying the crystal structure in terms of lattice constant.
- Will recognize the application of laser in finding the particle size and its role in diffraction studies.
- Will learn to synthesis of the nanomaterials and recognize its importance by knowing its nano particle size and its impact on its properties.

**Any 10 of the following experiments has to be performed during the I year I semester**

1. Determination of radius of curvature of a Plano-convex lens by forming Newton's rings.
2. Determination of wavelength of given source using diffraction grating in normal incidence method.
3. Determination of Numerical aperture, acceptance angle of an optical fiber.
4. Energy gap of a Semiconductor diode.
5. Hall effect – Determination of mobility of charge carriers.
6. B-H curve – Determination of hysteresis loss for a given magnetic material.
7. Determination of Crystallite size using X-ray pattern (powder) using debye-scheerer method.
8. Determination of particle size by using laser source.
9. Determination of dispersive power of a prism.
10. Determination of thickness of the thin wire using wedge Method.
11. Laser : Diffraction due to single slit
12. Laser : Diffraction due to double slit
13. Laser: Determination of wavelength using diffraction grating
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Synthesis of nanomaterial by any suitable method.



**References:**

1. Engineering Physics Practicals – NU Age Publishing House, Hyderabad.
2. Engineering Practical physics – Cengage Learning, Delhi.

**Outcomes:**

- Would recognize the important of optical phenomenon like Interference and diffraction.
- Would have acquired the practical application knowledge of optical fiber, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.

Would recognize the significant importance of nanomaterials in various engineering fields.

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**(15A99201) ENGINEERING & I.T. WORKSHOP**

**ENGINEERING WORKSHOP**

**Course Objective:**

*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
- c. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet
- d. 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.
- e. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.
- f. 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.

**References:**

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*, Jeyapooan, SaravanaPandian, 4/e Vikas
4. *Dictionary of Mechanical Engineering*, GHF Nayler, Jaico Publishing House.

**I.T. WORKSHOP**

**Course Objective:**

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

**Learning Outcome:**

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

**Preparing your Computer ( 5 weeks)**

**Task 1: Learn about Computer:** Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

**Task 2: Assembling a Computer:** Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

**Task 3: Install Operating system:** Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

**Task 4: Operating system features:** Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

#### **Networking and Internet (4 weeks)**

**Task 5: Networking:** Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimping activity, logical configuration etc should be done by the student. The entire process has to be documented.

**Task 6: Browsing Internet:** Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc.

If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

**Task 7: Antivirus:** Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

#### **Productivity tools (6 weeks)**

**Task 8: Word Processor:** Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

**Task 9: Spreadsheet:** Students should be able to create, open, save the

application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

**Task 10: Presentations :** creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

**Optional Tasks:**

**Task 11: Laboratory Equipment:** Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

**Task 12: Software:** Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from

department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

**References:**

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams”, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs”, Bigelows, TMH