

Draft Designed syllabus for “ENGINEERING TECHNOLOGY” MODULE (C.I.T.S.)

TRADE : ELECTRONICS and IT& ESM

**DURATION : 3 Months
(12 weeks)**

WEEK NO.	W/S CALCULATION AND SCIENCE	ENGINEERING DRAWING
1	<p>Quantities and Units of Measurement: International System of Units. Selected Physical Quantities. Forming Decimal Multiples and Submultiples of the SI Units. Unit Analysis and Conversion between Systems. Applying Unit Analysis to Energy Cost.</p> <p>Arithmetic Surd : Types of surds , Laws of radicals , addition , subtraction, multiplication and division of surds . Extraction of square roots of real numbers , decimal numbers and its application . Laws of Logarithms , Exercise on logarithm</p> <p>Algebra : Linear Equations in Two variables Square roots of algebraic expression Polynomials Rational Algebraic Expressions Quadratic Equations</p>	<p>Engineering drawing and its importance . Types of lines and their application : Line Practice – Straight line & inclined line. Lettering Practice Drawing of B.I.S. symbols related to D.C. ckts. P.T.C. , N.T.C. thermister, V.D.R, L.D.R and all types of relays.</p>
2	<p>Mensuration : area of rectangles , squares , triangles , circles regular polygons etc . Calculation of surface areas and volumes of solids- Prism , cylinder, sphere and cone . Calculation of weight of simple sold bodies such as cubes , squares and hexagonal prisms</p> <p>Trigonometry: Fundamental identities and examples. Trigonometric ratios of complementary angles Heights and distances – Introduction, simple problems</p>	<p>Dimensioning , their methods and specific uses. Drawing of symbols on A.C. fundamentals, transformers F.H.P. motors As per B.I.S. Drawing B.I.S. symbols on electronic components both passive and active. Free hand sketching of common Hand tools. Free hand sketching of electrical and Electronics tools.</p>
3	<p>Definition of matter; solid, liquid and gas; characteristics - shape, volume, density; change of state-melting(absorption of heat), freezing, evaporation (Cooling by evaporation), condensation, sublimation.</p> <p>Nature of matter : Elements, compounds and mixtures. Heterogenous and homogenous mixtures, colloids and suspensions.</p> <p>Particle nature, basic units : atoms and molecules. Law of constant proportions. Atomic and molecular masses. Mole Concept : Relationship of mole to mass</p>	<p>Types of Projections Simple orthographic projections in 1st angle method 3rd angle projection of various objects and exercises with dimension</p>

	<p>of the particles and numbers. Valency. Chemical formula of common compounds.</p> <p>Structure of atom : Electrons, protons and neutrons; Isotopes and isobars.</p>	
4	<p>Motion Force and Newton's laws Gravitation Work, Energy and Power Floatation</p> <p>UNIT TEST - I</p>	<p>Simple Orthographic views of different blocks in 3rd angle projection. Isometric views of objects . Sectioning and sectioned views</p> <p>UNIT TEST – I</p>
5	<p>Applying mathematics to DC Circuit : Find the equivalent resistance on series circuit & parallel circuit . Find the equivalent resistance , voltage and current across each component of a series circuit , parallel circuit and series parallel circuit . Solve the series parallel and network circuits using kirchoff's Law</p>	<p>CIRCUIT DIAGRAMS Of commonly used circuits such as rectifiers, amplifiers, OP-AMP Ckt oscillators, Multivibrators, power supplies , inverters , SCR motor speed control , shift registers , Counters, Multiplexer etc.</p>
6	<p>Applying mathematics to AC circuit –I : Introduction Voltage Relations in a Sine Wave Capacitors in A-C Circuits Power Relations in Capacitor Circuits Capacitors Connected in Series Resistance and Capacitance Connected in Series Principles of Inductive Reactance Resistance and Inductance Connected in Series.</p>	<p>SCHMATIC/ BLOCK DIAGRAMS of AM FM radio receiver , colour TV circuit , Star-Delta Starter, control Circuit for reversing of 3-phase induction motor. Satellite communication system , digital clock ,Architecture of Microprocessor and Micro Controller , computer etc .</p>
7	<p>Applying mathematics to AC circuit –II : Admittance and Susceptance Analysis of Parallel A-C Circuits Resistance and Capacitance Connected in Parallel Resistance and Inductance Connected in Parallel Analysis of Series-Parallel LCR Circuits Problems on transformer : Find the turns ratio ,efficiency and losses in transformers</p>	<p>FRONT PANEL DRAWINGS Of commonly used instruments such as CRO, Signal generator, Pulse Generator, IC tester, etc.</p>
8	<p>Problems on Diode & Rectifier circuit : Find the average dc,load current and efficiency , ripple factor in half wave and full wave rectifiers Problems related to zener regulator , series regulator and series parallel regulator circuits .</p>	<p>CHASIS/CABINET DRAWINGS Of some typical products of different sizes and shapes, say laboratory power Supply, Personal computer, Emergency light etc.</p>

	Problems on regulated power supply . Problems on transistor and biasing circuit : Find the I_B I_C I_E in various types of biasing circuits and transistor configuration circuits . UNIT TEST – II	UNIT TEST – II
9	Problems on transistor amplifier and operational amplifier : Calculate the voltage gain , current gain and power gain in dB units of the amplifier in various coupling circuits Problems related to OP-AMP circuits	SECTIONAL VIEWS Of some complicated assemblies showing constructional details such as Moving Coil galvanometer, LVDT, Cathode ray tube, etc.
10	Problems on Oscillator circuit : Calculation on Pulse duration , pulse width , frequency Find the frequency of oscillation in various oscillator circuits . Problems on modulation : Amplitude modulation Frequency modulation	EXPLODED VIEWS Such as mounting of a power transistor on a heat sink. DESIGNING A PCB LAYOUT AND MAKING ARTWORKS Of few simple circuits such as regulated power supply card. Amplifier card. Signal processing card. Etc.
11	Computer Numbering Systems : Introduction Decimal Numbering System (Base 10) Binary Numbering System (Base 2) Binary to Decimal Conversion Decimal to Binary Conversion Octal Numbering System (Base 8) Converting Binary Numbers into Octal Numbers Hexadecimal Numbering System (Base 16) Addition of Binary Numbers Addition of Octal Numbers Additional of Hexadecimal Numbers Subtraction of Binary Numbers Two's Complement Boolean Addition and Multiplication Logic Expressions and Symbology Rules and Laws of Boolean Algebra	LAYOUT DRAWING Of an inside of a typical control panel/cabinet for any industrial electronics Controller(PLC) . Drawing of an ideal IT& ESM /Electronic Mech. Lab. considering all the factors.
12	Review on general mathematics & sciences. Solving old Question Papers. Review on ELECTRONICS and IT& ESM trade base calculations & Question papers. PRE-FINAL TEST & FINAL EVALUATIONS	Review on the courses & Question papers. PRE-FINAL TEST & FINAL EVALUATIONS

NOTE : 1. Trainees may be allowed to use **Simple Pocket Calculator (Non-scientific)** during class-room practice & Examinations.

2. 'ELECTRONICS and IT& ESM' Trade related Calculations & Drawings may be taught under the guidance of concerned Trade Faculty.

LIST OF TOOLS AND EQUIPMENT FOR .E.T MODULE FOR A BATCH OF 30 TRAINEES

S.No.	Description of Item	Quantity
1.	White marker board (magnetic)	2 Nos.
2.	LCD Projector with latest configuration	1 No.
3.	OHP with latest configuration	2 Nos.
4.	Computer with latest configuration	4 Nos.
5.	Auto Cad software – 2008 or latest (Mech. & Elec)	4 Nos.
6.	Scanner cum colour printer with latest configuration	1 No.
7.	UPS, 5 KVA	2 Nos.
8.	Computer Chair	4 Nos.
9.	Computer Table	4 Nos.
10.	Drawing Board (2' x 1 1/2 ') Compact Type	30 Nos.
11.	White Screen for Projector	1 No.
12.	Steel Almirah (Big Size)	2 Nos.
13.	Student's Table (Modern Type)	30 Nos.
14.	Student's Chair (Modern Type)	3 Nos.
15.	Teacher's Table with Drawers (Big size Modern type)	2 Nos.
16.	Teacher's Chair (With foam seat & back modern type)	2 Nos.
17.	PCB Software	6 Licenses
18.	Digital Copier	1 No.
19.	Electronic Symbol templates	As required
20.	Mini Drafter	
21.	Laser Printer	1 No.
22.	Educational CDs	As required

Reference Book :

1. Basic Electronics Math ---By *Clyde N. Herrick*
2. Mathematics for Basic Electronics - by Daniel B. Sedory
3. Mathematics for Electricity & Electronics- Dr. Arthur Kramer
4. WORKSHOP CALCULATION AND SCIENCE FOR MECHANICAL TRADES - SETHI, G.S.
/KULDIP, KAKKAR
5. Electronics Mathematics --- By Robert Donovan
6. Mathematics Applied To Electronics - James Harter, Wallace Beitzel
7. Engineering Drawing - By Pal and Bhattacharyya
8. Basic engineering drawing By N.D. Bhatt

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