

**LIST OF MEMBERS OF THE TRADE COMMITTEE MEETING HELD ON 26.6.2009 AT
A.T.I. HYDERABAD TO DESIGN THE SYLLABUS FOR ENGINEERING TECHNOLOGY (E.T.)
MODULE FOR THE TRADES OF "ELECTRICIAN" AND "WIREMAN" UNDER C.I.T.S.**

SL. NO.	NAME& DESIGNATION	REPRESENTING ORGANISATION	COMMITTEE MEMBERS
	<u>S/SHRI</u>		
1.	R. K. CHUGH, <i>Director</i>	A.T.I., Hyderabad	Chairman
2.	Y. Balaji Raj, <i>Scientist – E</i>	ARCI, Hyderabad	Member
3.	D.S.Setty, <i>Scientific Officer-G</i>	NFC, Hyderabad	Member
4.	M. Shiv Kumar, <i>Dy. Genl. Manager</i>	BHEL, Hyderabad	Member
5.	N.Dattatrayulu, <i>DEE/ELS/SC</i>	South Central Railway	Member
6.	S.S.SuryaPrakash Rao, <i>Engineer</i>	Petti laminations Ltd.	Member
7.	P.Chandrashekar Reddy, <i>Jr.Engineer</i>	Petti laminations Ltd.	Member
8.	Sathyashankar B. P., <i>Joint Director</i>	A.T.I., Hyderabad	Member
9.	S. Suryanarayana, <i>Deputy Director</i>	A.T.I., Hyderabad	Member
10.	K. N. Halder, <i>Deputy Director</i>	ATI–EPI, Hyderabad	Member
11.	P. M. Radhakrishna Pillai, <i>Trg. Officer</i>	C.T.I., Chennai	Member
12.	Girish Deshpande, <i>Training Officer</i>	R.D.A.T., Hyderabad	Member
13.	R. N. Manna, <i>Training Officer</i>	CSTARI, Kolkata	Member
14.	M. Joshoua, <i>Assistant Director</i>	A.T.I., Hyderabad	Member
15.	S. Venu Gopalan, <i>Training Officer</i>	A.T.I., Hyderabad	Member
16.	T. K. Bhattacharya, <i>Training Officer</i>	A.T.I., Hyderabad	Member
17.	A. K. Samaddar, <i>Training Officer</i>	A.T.I., Hyderabad	Member

Draft Designed syllabus for “ENGINEERING TECHNOLOGY” MODULE (C.I.T.S.)**TRADE : ‘Electrician’ & ‘Wireman’****DURATION : 3 Months
(12 weeks)**

WEEK NO.	W/S CALCULATION AND SCIENCE	ENGINEERING DRAWING
1	<p>Fractions – Simple, Complex & Decimals. Simplifications, L.C.M.</p> <p>Square Roots – Whole numbers & Fractions.</p> <p>Use of Simple Pocket Calculator (Non-Scientific) in Workshop calculation Practice.</p> <p>Units – Systems of units, Classification of units, S.I. units, Conversion between Metric & British System of units.</p> <p>Metals – Mechanical properties of materials. Ferrous & non-ferrous metals & their alloys – properties, composition & their uses.</p>	<p>Line Practice – Straight line & inclined line.</p> <p>Types of Lines & their uses.</p> <p>Conventional symbol of materials.</p> <p>Free hand sketching of common Hand tools.</p> <p>Free hand sketching of electrical tools.</p>
2	<p>Ratio & Proportions – Shop problems.</p> <p>Percentage – Shop problems & applications.</p> <p>Heat – treatment :- Critical temperatures, Annealing, Normalising, Tempering, Hardening, Case-hardening.</p> <p>Mass, speed, velocity, acceleration.</p> <p>Equations of plane motion & motion under force of gravity - applications.</p>	<p>Dimensioning techniques.</p> <p>Use of reduced & enlarged scales.</p> <p>Different symbols used in electrical installations and circuit elements as per IS:732.</p> <p>Symbols for motor – starter.</p> <p>Symbols for Transfer & rotating machine.</p>
3	<p>Logarithm & Antilogarithm – Characteristics & Mantissa. General laws of logarithm. Simplifications using Logarithm – practice on different exercises.</p> <p>Newton's three laws of motion – prove that $P = m.a$</p>	<p>Practice on Electrical symbols as per IS:732.</p> <p>Drawing of D-type cartridge fuse, H.R.C. fuse.</p> <p>Drawing diagram of plug & socket outlets.</p>

WEEK NO.	W/S CALCULATION AND SCIENCE	ENGINEERING DRAWING
3	<p>Algebra – simplifications, different algebraic formulae & applications. Factorisations, shop problems.</p> <p>Force & Weight – Their units, applications.</p> <p>Work – Power – Energy : definitions, units, B.H.P., I.H.P. & efficiency of an engine.</p>	<p>Simple Orthographic projection – difference between 1st angle and 3rd angle projections.</p> <p>Orthographic views of simple blocks in 3rd angle method.</p> <p>Blue print reading of connection to motors through Ammeter, Voltmeter & Energy meter.</p>
4	<p>Solving Equations – simple, quadratic & simultaneous equations, transpositions etc. Problems on Algebra – shop problems.</p> <p>Potential energy & Kinetic energy – applications. Energy calculation in domestic & industrial circuits.</p> <p>Basic electricity – current, voltage, EMF, resistance, Ohm's Law, Series & parallel circuits.</p> <p style="text-align: center;"><u>UNIT TEST - I</u></p>	<p>Simple Orthographic views of different blocks in 3rd angle projection.</p> <p>Battery charging circuits.</p> <p>Wiring diagram of an alternator (Control Panel).</p> <p style="text-align: center;"><u>UNIT TEST - I</u></p>
5	<p>Mensuration – Area of different triangles, square, rectangle, trapezium, rhombus, parallelogram, circle, hollow circle, semi-circle, sector, segment etc. – shop problems.</p> <p>Hook's Law, Young's Modulus of elasticity, Poisson's ratio – shop problems.</p> <p>Lever – different types, working principle. Moment of a lever – technical problems.</p>	<p>Practice on simple orthographic views – 3rd angle projections.</p> <p>Wiring diagram of Squirrel cage induction motor with ICTP and starter (DOL).</p> <p>Control panel diagram of motor – generator set.</p> <p>D.C. 3-point starter and 4-point starter.</p>

WEEK NO.	W/S CALCULATION AND SCIENCE	ENGINEERING DRAWING
6	<p>Mensuration – Area & perimeter of an ellipse, shop problems.</p> <p>Volume of solids & hollow bodies – Prisms and Pyramids. Volume of cube, cuboids, Rectangular solids, hexagonal prism, triangular prism etc. shop problems.</p> <p>Composition & resolution of forces. Law of parallelogram of forces. Lami's Theorem – shop problems.</p> <p>Specific resistance, temperature co-efficient of resistance applications.</p>	<p>Practice on simple orthographic views – 3rd angle projections.</p> <p>Internal diagram of different types of Single phase A.C. motor.</p> <p>Connection diagram of starter with protective devices for slip-ring induction motors.</p>
7	<p>Volume & surface area of solid & hollow cylinders, hexagonal, triangular, square pyramids etc., – applications & shop problem.</p> <p>Density, Specific gravity & Archimedes Principle – applications.</p> <p>Determination of Specific gravity of solids & liquids using Archimedes Principle – applications.</p> <p>Heating effects of electric current – applications.</p>	<p>Practice on simple orthographic views of different objects in 3rd angle projection method.</p> <p>Winding diagram of 3 phase induction motor.</p> <p><u>Ex-1</u> 3Φ, 4 Pole, 24 Slots, Single Layer winding.</p> <p><u>Ex-2</u> 3Φ, 4 Pole, 24 Slots, Double Layer Lap winding with full pitch coils.</p>
8	<p>Volume & surface area of a cone, taper cylinder, solid & hollow sphere, Hemisphere – applications & technical problems.</p> <p>Heat & Temperature – Their units, Effects of heat, Specific heat, Latent heat.</p> <p>Kirchoff's Law – Voltage law & Current law, applications in different combinations, solving problems.</p> <p style="text-align: center;">UNIT TEST – II</p>	<p>Simple orthographic views of different simple blocks in 3d angle method.</p> <p>D.C. simplex lap & wave winding for known pole pitch, coil pitch, back & front pitch progressive winding.</p> <p>A.C. 3 phase forward reverse magnetic starter.</p> <p style="text-align: center;">UNIT TEST – II</p>

WEEK NO.	W/S CALCULATION AND SCIENCE	ENGINEERING DRAWING
9	<p>Trigonometry – Properties of triangles & acute angles. Different system of units for measuring angles.</p> <p>Trigonometric Ratios & Functions – different formulae, trigonometric proof, height & distance problems, taper calculations – technical problems.</p> <p>Sensible heat, Thermal capacity, Water equivalent of heat – applications.</p> <p>Temperature – Different thermometric scales & conversions between them, temperature measuring instruments.</p> <p>Difference between heat & temperature. Thermal contact & Thermal expansion – Co-efficient of Linear, Superficial & Cubical expansions – shop problems.</p>	<p>Simple orthographic views of different objects in 1st angle projection.</p> <p>Pipe earthing as per B.I.S.</p> <p>Circuit diagram of speed control of shunt & compound motor by Armature & Field control methods.</p> <p>Sectional view of 500 KVA power transformer with all protective devices.</p>
10	<p>Simple machine – load, effort, Mechanical Advantage, Velocity Ratio & efficiency of a machine.</p> <p>Simple pulley block, Simple wheel & axle, Differential wheel & axle, Simple screw jack – technical problems.</p> <p>A.C circuits – resistance, capacitance, inductance, impedance, power, power factor in R-L, R-C & R-L-C circuits. RMS value, average value. Resonance circuit – solving related problems.</p> <p>Calculation of line current, phase current & line voltage, phase voltage & 3Φ power in Star & Delta circuits.</p>	<p>Orthographic views of different objects in 1st angle projection.</p> <p>Line diagram of a power station.</p> <p>Circuit diagram of Star-Delta starter (Manual, Semi-automatic & Automatic) connected with 3Φ Squirrel cage induction motor.</p>
11	<p>Battery – battery charging, electrolysis, series & parallel group, Reverse order group - related problems.</p> <p>D.C. generator, D.C motors, speed equations, alternators, polyphase induction motors – related problems.</p>	<p>Half wave, full wave & bridge circuits.</p> <p>Battery charging circuit (const. current & const. voltage method)</p> <p>Introduction on Auto-cad.</p>

WEEK NO.	W/S CALCULATION AND SCIENCE	ENGINEERING DRAWING
12	Review on general mathematics & sciences. Solving old Question Papers. Review on electrical 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. Trainees are suggested to use frequently the **Mini drafting Machine** during practice of Drawing & in Examinations.
 3. **'Electrician' & 'Wireman'** 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

<u>SL.</u>	<u>DESCRIPTION OF ITEMS</u>	<u>QUANTITY</u>
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. & Elect.)	4 nos.
6.	Scanner cum Printer with latest configuration	1 no.
7.	UPS	4 nos.
8.	Computer Chair	4 nos.
9.	Computer Table	4 nos.
10.	Drawing Board (2' X 1½')	30 nos.
