WORKSHOP CALCULATION & SCIENCE – I

(Common for CTS Engineering trades during 1st year)

Sl. No.	Syllabus	Time in hrs.
I.	**Unit, Fractions**	**4**
1	Classification of Unit System	
2	Fundamental and Derived Units F.P.S, C.G.S, M.K.S and SI Units	
3	Measurement Units and Conversion	
4	Factors, HCF, LCM and Problems	
5	Fractions – Addition, Subtraction, Multiplication and Division	
6	Decimal Fractions - – Addition, Subtraction, Multiplication and Division	
8	Solving Problems by using calculator	
II.	**Square Root: Ratio and Proportions, Percentage**	**6**
1	Square and Square Root	
2	Simple problems using calculator	
3	Application of Pythagoras Theorem and related problems	
4	Ratio and Proportions	
5	Direct and Indirect proportion	
6	Percentage	
7	Changing percentage to decimal	
III.	**Material Science**	**8**
1	Types of metals	
2	Physical and Mechanical Properties of metals	
3	Types of ferrous and non-ferrous metals	
4	Introduction of iron and cast iron	
5	Difference between iron and steel, alloy steel and carbon steel	
6	Properties and uses of rubber, timber and insulating materials	
IV.	**Mass, Weight, Volume, and Density**	**4**
1	Mass, volume, density, weight & specific gravity	
2	Related problems for mass, volume, density, weight & specific gravity	
V.	**Speed and Velocity, Work Power and Energy**	**12**
1	Rest, motion, speed, velocity, difference between speed and velocity, acceleration and retardation	
2	Related problems on speed and velocity	
3	Potential energy, Kinetic Energy and related problems with related problems	
4	Work, power, energy, HP, IHP, BHP and efficiency	
VI.	**Heat &Temperature and Pressure**	**12**

1	Concept of heat and temperature, effects of heat, difference between heat and temperature	
2	Scales of temperature, Celsius, Fahrenheit,Kelvin and Conversion between scales of temperature	
3	Temperature measuring instruments, types of thermometer, pyrometer and transmission of heat - Conduction, convection and radiation	
4	Co-efficient of linear expansion and related problems with assignments	
5	Problem of Heat loss and heat gain with assignments	
6	Thermal conductivity and insulators	
7	Boiling point and melting point of different metals and Nonmetals	
8	Concept of pressure and its units in different system	
VII.	**Basic Electricity**	**12**
1	Introduction and uses of electricity, molecule, atom, how electricity is produced, electric current AC, DC and their comparison, voltage , resistance and their units	
2	Conductor, Insulator, types of connections- Series and Parallel,	
	Ohm's Law, relation between VIR & related problems	
3	Electrical power, energy and their units, calculation with assignments	
4	Magnetic induction, self and mutual inductance and EMF generation	
5	Electrical Power, HP, Energy and units of electrical energy	
VIII.	**Mensuration**	**10**
1	Area and perimeter of square, rectangle and parallelogram	
2	Area an Perimeter of Triangle	
3	Area and Perimeter of Circle, Semi-circle , circular ring, sector of circle, hexagon and ellipse	
4	Surface area and Volume of solids- cube, cuboids, cylinder, sphere and hollow cylinder	
5	Finding lateral surface area , total surface area and capacity in liters of hexagonal, conical and cylindrical shaped vessels	
IX.	**Levers and Simple Machines**	**6**
1	Simple machines, Effort and load, mechanical advantage, velocity ratio, efficiency of machine, relation between efficiency, velocity ratio and mechanical advantage	
2	Lever and its types	
X.	**Trigonometry**	**6**
1	Measurement of Angle, Trigonometrical Ratios, Trigonometric Table	
2	Trigonometry-Application in calculating height and distance (Simple Applications)	
	Total	**80**