

Syllabus for the subject

of

WORKSHOP CALCULATION & SCIENCE

(For 3rd & 4th semester)

Under

CRAFTSMEN TRAINING SCHEME (CTS)

(For Mechanic Mechatronics)

Re-Designed

in

2015

By

Government of India

Ministry of Skill Development & Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

Block - EN - 81 SECTOR - V, SALT LAKE CITY, KOLKATA - 700 091

**Syllabus for Workshop Science and Calculation
Mechanic Mechatronics
3rd Semester**

Calculation			Science		
Sl. No.	Description	Hrs.	Sl. No.	Description	Hrs.
1	Forces -Composition and resolution, spring force, moment and torque.	21	1	Plastic overview: Thermoplastics, thermoset, and plastic processing	21
2	Strength of material -stress, strain, yield strength and cross sectional area calculation, factor of safety		2	Use of data handbook (Westermann table)* -Graph interpretation, Raw material standard sizes, material composition, properties	
3	Screw joint calculation - Screws and nuts, tightening torque		3	Tensile strength of screws, tightening torques	
4	Sheet Metal - Bending length calculations		4	Limit, fits and tolerance	
5	Power transmission - Belt, gear and chain, calculation of speed, velocity ratio, torque		5	Gear terminology, gear trains, velocity ratio, mechanical advantage and power screws.	
6	Estimation and costing: Calculation of machining time, machining cost, material cost, labour cost & total cost		6	Estimation and costing basics: Elements of cost, direct & indirect cost, fixed & variable	

*Scientific calculator and data book may be made available for 3rd and 4th semester.

**Syllabus for Workshop Science and Calculation
Mechanic Mechatronics
4th Semester**

Calculation			Science		
Sl. No.	Description	Hrs.	Sl. No.	Description	Hrs.
1	Automation: Calculation of pressure, forces, flow rate, cylinder force, speed and air consumption PSI, bar, atmospheric pressure, pressure gauge and absolute pressure.	21	1	Pascal's law for pressure, force & velocity. Effect of viscosity with respect to Temperature, Working principles of pressure flow meters and basic units of pressure & converting units.	21
2	Number Systems: Introduction, Decimal, Binary, Octal, Hexadecimal, BCD code, ASCII code, Bit, Byte, KB, MB, GB, Conversion, Addition, Subtraction, Multiplication, Division, Boolean Algebra: Simplification of Boolean Algebra and equations.		2	Electronics Basics: Semiconductor, diode, working of diodes. Transistors:- PNP-NPN, triode and transistor	
3	Electrical: Calculation of resistance, reactance and capacitance		3	Electrical Basics- Ohm's Law, Kirchhoff's law, electromagnetism	
4	Simple problems on profit and loss. Simple and compound interest.		4	Sensor technology: Principle of sensor, types and applications	
5	System calculation: Work done, power consumption, overall efficiency calculation		5	Mechanical & Electrical work, energy and power, efficiency	