

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

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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	