10. RESOURCE REQUIREMENTS

10.1 Physical Resources

10.1.1 Equipment Requirement:

Sr. No.	Description	Qty	Total Price (Rs)
CARPENTRY SHOP			
1	Work benches fitted with carpenter vices	5	20,000
2.	Circular saw grinder	1	6,000
3.	Wood cutting band saw-vertical	1	10,000
4.	Bench grinder	1	5,000
5.	Drilling machine	1	8,000
6.	Wood turning lathe	1	40,000
7.	Wood Planner	1	20,000
8.	Tool accessories measuring and marking Instruments	25	25,000
9.	Band saw blade brazing unit	1	10,000
FITTING AND PLUMBING SHOP			
1.	Work benches with vices (4 vices on each bench)	5	30,000
2.	Marking tables with scribers	4	24,000
3.	Surface plates	5	20,000
4.	Bench grinders	1	6,000
5.	Drilling machine	2	12,000
6.	Power Hacksaw	1	20,000
7.	Sheet Bending Machine	1	40,000
8.	Tool kits – taps, dies, drills	25	40,000
9.	Tool kits – chiesels, hammers, files, hacksaw	25	25,000
10.	Accessories like calipers, V blocks, height, gauges steel rules and scribers	25	50,000
11.	Pipe vice	4	1,000
12.	Chain wrenches	5	1,250
13.	Ring spanner set	5	600
14.	Pipe die set 2”	2 set	1,000

15.	Pipe bending device	1	5,000
16.	Various pluming fitting	LS	2,000
FOUNDRY SHOP			
1.	Moulding boxes	40	8,000
2.	Ladles	5	2,000
3.	Tool Kits	10 set	5,000
4.	Quenching tanks	2	5,000
5.	Portable grinder	1	3,000
6.	Pit furnace with blower	1	10,000
PAINT SHOP			
1.	Spray gun with hose pipe	1	1,000
2.	Paint brushes	20	2,000
3.	Paint/Varnish	LS	2,000
4.	Air Compressor with 2 hp motor	1 set	10,000
5.	Miscellaneous	LS	5,000
SMITHY SHOP			
1.	Blacksmithy forge (with open hearths, accessories to match the forge)	20	40,000
2.	Wrought iron anvils	20	20,000
3.	Swage blocks	4	8,000
4.	Blower with accessories, motor switch etc	1	6,000
5.	Work benches with vices	2	6,000
6.	Power hammer	1	20,000
7.	Tools and accessories – hammers, swages, tongs, pokers, pullers etc	20	10,000
WELDING SHOP			
1.	Electrical welding transformer set with accessories	3	30,000
2.	Gas Cutting Unit	1	3,000
3.	Work benches with vices	3	5,000
4.	Welding generator set	1	10,000
5.	Oxy acetylene welding set with accessories	1	7,000
6.	Acetylene generating set	1	6,000
7.	Electric welder tool kit	10	10,000
8.	Projection welding machine	1	15,000
9.	Brazing equipment with accessories	1	10,000
10.	Soldering irons	3	1,000

11.	Pedestal grinder	1	10,000
12.	Metal spraying gun	1	10,000
13.	Spot welder	1	25,000
14.	TIG welding set	1	1,00,000
15.	MIG welding set	1	1,00,000
16.	Welding Partition Screen	5	2,500
MATERIAL AND METALLURGY LABORATORY			
1.	Salt bath oil fired furnace	1	30,000
2.	Salt bath electric resistance furnace	1	40,000
3.	Electric furnace muffle type	1	60,000
4.	Forced circulation tempering furnace	1	30,000
5.	Quenching tank	2	5,000
6.	Work benches	2	4,000
7.	Pyrometers	1	1,000
8	Pot for bailing out the salt	1	1,500
9.	Metallurgical microscope	1	35,000
10.	Abrasive cut off machine	1	50,000
APPLIED MECHANICS LABORATORY			
1.	Polygon of forces apparatus	1	1,000
2.	Apparatus for reaction at supports	1	1,000
3.	Jib crane	1	1,000
4.	Screw jack	1	300
5.	Inclined plane and friction apparatus	1	500
6.	Worm and worm wheel	1	1,500
STRENGTH OF MATERIALS LABORATORY			
1.	Brinell and Rockwell hardness tester	1	30,000
2.	Impact testing machine	1	20,000
3.	Microprocessor based universal testing machine	1	4,00,000
4.	Torsion testing machine (fully computerized)	1	2,00,000
ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY			
1.	Wattmeter	5	10,000
2.	Ammeter	5	10,000
3.	Voltmeter	5	7,500

4.	DC shunt motor	1	5,000
5.	Single phase variac	1	2,500
6.	Single phase transformer	1	5,000
7.	Resistive load	1	4,000
8.	Multimeter	1	4,000
9.	CRO	1	15,000
10.	Regulated supply	1	8,000
11.	Signal generator	1	5,000
12.	3-phase inductor motor	1	5,000
13.	3-phase variac	1	8,000
14.	DC shunt generator coupled with motor and starter	1	25,000
15.	Rheostat	2	2,500
16.	Tachometer	1	5,000
MECHANICAL WORKSHOP			
1.	Centre lathes	10	5,00,000
2.	Tool room lathe	1	1,00,000
3.	Lathe with copy turning attachment and other attachments	1	1,50,000
4.	Universal milling machine	1	1,25,000
5.	Vertical milling machine	1	75,000
6.	Shapers	2	1,00,000
7.	Radial drilling machine	1	25,000
8.	Upright drilling machine	1	20,000
9.	Gear Shaper	1	75,000
10.	Centreless grinder	1	80,000
11.	Universal cylindrical grinder	1	75,000
12.	Hydraulic surface grinder	1	50,000
13.	Tool and Cutter grinder	1	50,000
14.	Power hacksaw	1	25,000
15.	Pedestal grinder	1	5,000
16.	Electro discharge machine	1	4,00,000

17.	Work bench	3	6,000
18.	Precision instruments	1	5,000
19.	Surface plates	2	15,000
20.	Hand tools and accessories	2	6,000
21.	CNC trainer lathe	1	3,00,000
22.	CNC trainer milling machine	1	4,00,000
23.	PC Computer	2	1,00,000
24.	Computer based NC Programming Software	1	1,50,000
25.	CNC Simulation software	1	1,00,000
26.	CNC Milling machine accessories and holding devices	LS	1,00,000
HYDRAULICS LABORATORY			
1.	Piezometer tube	2	1,000
2.	U tube differential manometer	2	2,000
3.	Inclined manometer	1	1,000
4.	Bourdan pressure gauge	1	1,000
5.	Hydraulic jack	1	4,000
6.	Hydraulic press	1	20,000
7.	Bernoulli’s apparatus	1	15,000
8.	Venturimeter apparatus with differential manometer	1	10,000
9.	Pipe friction apparatus	1	15,000
10.	Reciprocating pump	1	20,000
11.	Centrifugal pump	1	25,000

Sr. No.	Description	Qty	Total Price (Rs)
12	Model of pelton wheel	1	5,000
13	Model of Francis turbine	1	5,000
THERMODYNAMICS LABORATORY			
1.	Throttling Calorimeter	1	25,000
2.	Bomb Calorimeter	1	40,000
3.	Junker's Gas Calorimeter	1	30,000
4.	Gravimetric Analysis	1	15,000
5.	Orsat Apparatus	1	20,000
6.	Mechanical Types Co_2 Recorder	1	25,000
7.	Single Stage Reciprocating	1	50,000
8.	Rotary Compressor	1	25,000
9.	Flash Point Apparatus	1	10,000
10.	Pyrometer	2	2,000
11.	Lancashire boiler model	1	5,000
12.	Model of impulse turbine	1	5,000
13.	Model of reaction turbine	1	5,000
14.	Model of surface condenser	1	5,000
15.	Spring loaded safety valve	1	6,000
16.	Single cylinder 2 stroke petrol engine	1	35,000
17.	Single cylinder 4 stroke petrol engine	1	40,000
18.	Multicylinder petrol engine test ring	1	70,000
IQC LABORATORY			
1.	Digital vernier calliper	3	5,000
2.	Digital micrometer	3	5,000
3.	Height gauge	2	1,500
4.	Depth gauge	2	1,000
5.	Combination set	1	1,000
6.	Bevel protractor	1	1,000
7.	Sine bar	1	1,000

8.	Precision balls and rollers	1	500
9.	Surface plate	2	15,000
10.	Slip gauges set	1	10,000
11.	Comparator – Mechanical , Pneumatic	2	40,000
12.	Gear tooth vernier	1	2,000
13.	Snap and ring gauges	1	1,500
14.	Feeler gauge, radius gauge	1	1,000
15.	Angle plate	1	1,000
16.	Tool makers microscope	1	40,000
17.	Profile projector	1	75,000
18.	Surface roughness tester	1	60,000
COMPUTERS LABORATORY			
1.	IDEAS	1	5,00,000
2.	AutoCAD	1	50,000
3.	Computer – Pentium	11	4,00,000
4.	Mechanical Desk Top	1	50,000
5.	Catia	1	2,00,000
6.	Digitiser	1	50,000
7.	Plotter	1	75,000
8.	Scanner	1	3,500
9.	Printer (Laser, DMP)	3	80,000
REFRIGERATION AND AIR CONDITIONING LABORATORY			
1.	Refrigeration trainer	1	6,000
2.	Air conditioner trainer	1	10,000
3.	Water cooler	1	6,000
4.	Experimental Ice plant	1	10,000
5.	Refrigeration compressor	1	3,000
6.	Safety controls (HP, LP Cut outs, oil pressure controls), solenoid valve, expansion valves, thermostats, charging board	1 set	3,000
7.	Gas charging equipment	1	8,000
8.	Vacuum pump	1	3,000

NOTE:

In addition to above, laboratories in respect of physics, chemistry , Tool Engineering will be required for effective implementation of the course.

Provision for overhead projector, TV with VCR facility slide cum strip projector, TV with VCR facility slide cum strip projector, 16 mm film projector, photocopier, PC-XT facilities, duplicating machines, drafting machines etc has also to be made.

10.1.2 Space Requirement:

Norms and standards laid down by All India Council for Technical Education (AICTE) may be followed to work out space requirement in respect of class rooms, tutorial rooms, drawing halls, laboratories, space required for faculty, student amenities and residential area for staff and students.

10.1.3 Furniture Requirement

Norms and standards laid down by AICTE be followed for working out furniture requirement for this course.

10.2 Human Resources:

Weekly work schedule, annual work schedule, student teacher ratio for various group and class size, staffing pattern, work load norms, qualifications, experience and job description of teaching staff workshop staff and other administrative and supporting staff be worked out as per norms and standards laid down by the AICTE

Following are the qualifications and experience for the teaching faculty and technical staff

Qualification	Experience
Lecturer First class B.E./B.Tech in Mechanical Engineering/Production Engineering or equivalent	NIL
Sr.Lecturer First class B.E./B.Tech in Mechanical Engineering/Production Engineering or equivalent	5 years experience in teaching/industry/ research at the level of Lecturer or equivalent
Head of Department M.E./M.Tech in Mechanical Engineering/ Production Engineering or equivalent with first class at Bachelor's level	8 years experience in teaching/industry/ research at the level of Lecturer or equivalent
Note: Candidates from industry/profession with B.E/B.Tech in Mechanical Engineering/Production Engineering or equivalent and with recognized professional work experience equivalent to Master's degree and 5 years experience may also be eligible for the post of H.O.D.	
Workshop Superintendent First class B.E./B.Tech in Mechanical Engineering/Production Engineering or equivalent	2 years industrial experience
OR Diploma in Mechanical Engineering/Production Engineering or equivalent	8 years industrial experience
Instructor/Technician Diploma in Mechanical Engineering/Production Engineering or equivalent	2 years practical experiences in teaching/ industry at appropriate level