

10. RESOURCE REQUIREMENT:

10.1 Physical Resources

10.1.1 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.

10.1.2 Equipment Requirement:

1. Name of Laboratory: Construction Materials Testing
 - A) Concrete
 - B) Roads and Soils

Sr . No.	Item	Quantity
A. CONCRETE LABORATORY		
1.1	Compression testing machine (100 T. Capacity)	1
1.2	Vibration machine	1
1.3	Electrically heated oven (Thermostatically controlled)	1
1.4	Blaine Air permeability Apparatus (for testing fineness of cement)	2
1.5	Vicat's Apparatus	4
1.6	Le Chatelier's soundness apparatus (to determine quantity of free lime in cement)	2
1.7	Slump Cone (to determine the workability of concrete)	2
1.8	Compaction factor apparatus (to determine the workability of concrete)	1
1.9	Vee-Bee apparatus (to determine the workability of concrete)	1
1.10	Platform weighing machine	1
1.11	Concrete cube moulds	12 each

Sr . No.	Item	Quantity
1.12	Concrete mixers	1
1.13	Sieve shaker	1
1.14	Set of sieves	2 set
1.15	Beam mould	2
1.16	Impact testing machine	2
1.17	Needle vibrator	1 each
1.18	Flakiness index apparatus	2
1.19	Elongation index apparatus	2
1.20	Bar bending and cutter apparatus	2 set
1.21	Bulk density apparatus	2
1.22	Wire basket	4
1.23	Riffle sampler	2
1.24	Table vibrator	2
1.25	Concrete test hammer	1
1.26	Ultrasonic pulse velocity apparatus	1
B. ROADS AND SOILS LABORATORY		
1.1	Ring and Ball apparatus (with heating mantle)	1
1.2	CBR apparatus with loading machine	1
1.3	Flash point and fire point apparatus (Cleaveland type)	1
1.4	Los angles Abrasion testing machine apparatus	1
1.5	Water bath (Thermostatically controlled)	1

Sr . No.	Item	Quantity
1.6	Aggregate impact value testing apparatus with automatic blow counter	2
1.7	Penetration value apparatus with timer	1
1.8	Viscometer Capillary type	
1.9	Ductility machine	1
1.10	Direct shear test apparatus	1
1.11	Drying oven(Thermostatically controlled)	1
1.12	Electronic balance	1
1.13	Standard penetration test equipment	1
1.14	Soil exploration equipment (Augers etc)	1
1.15	Sand replacement method apparatus	2
1.16	Liquid limit and plastic limit apparatus	2 each
1.17	Compaction apparatus using light compaction (Proctor Test)	2
1.18	Grain size distribution test apparatus (sieve set)	2 set
1.19	Sieve shaker	2
1.20	Permeability apparatus	1
1.21	Proctor penetrometer	1
1.22	Core cutter apparatus	2
1.23	Rapid moisture meter	2
1.24	Pycnometer with burette	6
1.25	Liquid limit apparatus (Cone penetrometer method)	2

Sr . No.	Item	Quantity
2.	Name of Laboratory : SURVEY EQUIPMENT AND STORES	
2.1	Plane Table with stand and accessories	16
2.2	Dumpy level, quick setting level and engineers level	
	i) Dumpy level	8
	ii) Quick setting level	8
	iii) Engineer' level	1
2.3	Transit theodolite(Vernier type)	12
2.4	Prismatic compass	15
2.5	Planimeter	5
2.6	Lavelling staves(All aluminimum)	5
2.7	Total Station	2
2.8	Ranging rods	60
2.9	Pantagraph	2
2.10	Optical square	5
2.11	Abney level	5
2.12	Tangent clinometer (Indian Pattern)	5
2.13	Mirror stereoscope	1
2.14	Telescopic Alidade	2
2.15	Prismatic binoculars	1
2.16	Metric chain/non-metrics	10
2.17	Metallic taps/Fibre glass/Invertape	20
2.18	Tentage, camp equipment and other misc. items and instruments	LS
2.19	Modern survey equipment	LS

Sr . No.	Item	Quantity
2.20	Theodolite (Digital) Distomat	1
2.21	Electronics Distance Measurement (EDM)	1
2.22	Total Station	1
2.23	GPS Hands Instrument	1
3.	Name of the Laboratory: FLUID MECHANICS AND IRRIGATION LABORATORY	
3.1	Hydraulic Bench	2
3.2	Impact of Jet apparatus	1
3.3	*Flow measurement apparatus by Venturimeter and Orificemeter	1
3.4	*Pipe Friction apparatus	1
3.5	*Orifice and Mouthpiece apparatus	1
3.6	*Bernoulli's Theorem apparatus	1
3.7	*Flow over a notch apparatus	1
3.8	*Losses in pipe bends apparatus	1
3.9	Reyonold's apparatus	1
3.10	Working models of:	
	- Pelton wheel Turbine	1
	- Francis Turbine	1
	- Reciprocating pump	1
	- Centrifugal pump	1
	- Hydraulic Ram	1
	- Kaplan turbine	1

Sr . No.	Item	Quantity
3.11	Manometers of different types and pressure gauges like:	
-	Piezometer	6
-	Differential Manometers (Double column type manometer)	10
-	Universal manometers (Single column type manometer)	2
-	Inclined tube manometer	2
-	Bourden pressure gauges	2
-	Compound Gauges(Vacuum and pressure gauge combined)	2
*	These apparatus should be purchased alongwith hydraulic bench as the design of these apparatus depend upon the design of Hydraulic bench	
3.12	Current meter	1
3.13	Centrifugal pump test Rig.	1
3.14.	Submergible pump set apparatus	1
3.15	Misc.tools etc.	LS
4.	Name of the Laboratory : CIVIL ENGINEERING FABRICATION AND ERECTION SHOP	
4.1	Masonry erection tools, such as iron pans, trowels, plumb bobs, showels, sets pick axes, corner squares etc.	10
4.2	Carpenter's tool such as tenonsaw, planes screw drivers, chisel sets, sets marking guages, pliers, hammers, augers, bevel squares, files, drills etc.	10
4.3	Plumber tools, plumbing vice, die and tap sets, pipe wrenches of different sets sizes, pipe cutters, spanner sets, hammer plier.	5
4.4	Centering, shuttering and scaffolding (for an ordinary residential building)	1 set

Sr . No.	Item	Quantity
4.5	Pipes and pipe fittings, valves, gulley traps, GI grating, manhole, covertraps, WC pan with foot rest, flushing cistern, urinal pan with cistern, taps, wash basin, water meter etc.	LS
4.6	Hoisting and conveying equipment tripod, hoist, pulleys, ladders, ballis etc.	LS
	Compressed air equipment with accessories	1
4.7	Steel fabrication equipment with fabricating small trusses, reinforcement cages, small girder, column beam connections, column truss connection	1set
4.8	Floor grinding/polishing machine, spray guns etc	LS
5.	Name of the Laboratory: ENVIRONMENTAL ENGINEERING LABORATORY	
5.1	Lovibond comparator (for colour determination)	1
5.2	Colorimeter (for colour determination)	1
5.3	Centrifuge	1
5.4	Turbidimeter	1
5.5	pH meter	1
5.6	Jar test apparatus (Flocculator)	1
5.7	Dissolved oxygen meter	1
5.8	B.O.D incubator	1
5.9	Water bath with digital controller	1
5.10	Hot air oven	1
5.11	Hot plate	2

Sr . No.	Item	Quantity
5.12	Bacteriological incubator	1
5.13	Colony counter	1
5.14	Water sampler	1
5.15	Water analysis kit	1
5.16	Water distill	1
5.17	Conductivity meter	1
5.18	Electronic balance	1
5.19	Chemical Balance	1
5.20	Inverted microscope	1
5.21	Model of oxidation ditch	1
5.22	Working model of Trickling Filter	1
5.23	Misc. items like noise measurement apparatus etc.	LS
6.	COMPUTER LAB	
6.1	Auto CAD	Any other equivalent software may be purchased depending upon the availability
6.2	Auto Civil	
6.3	STAAD Pro	
6.4	Primavera/MS Project	
6.5	MX Road	

NOTE:I

In addition to above laboratories in respect of physics, chemistry, applied mechanics, strength of materials, workshops, computer centre etc 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.

10.1.3 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. The website www.aicte.ernet.in may be referred for downloading current norms and standards pertaining to technician courses.