

9. RESOURCE REQUIREMENT:

9.1 Physical Resources

9.1.1 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.

9.1.2 Equipment Requirement:

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

Sr . No.	Item	Qty	TentativeTotal Cost (Rupees)
A. CONCRETE LABORATORY			
1.1	Compression testing machine	1	2,00,000
1.2	Vibration machine	1	20,000
1.3	Electrically heated oven (Thermostatically controlled)	1	10,000
1.4	Blaine Air permeability Apparatus (for testing fineness of cement)	2	5,000
1.5	Vicat's Apparatus	4	1,500
1.6	Le Chatelier's soundness apparatus (to determine quantity of free lime in cement)	2	1,000
1.7	Slump Cone (to determine the workability of concrete)	2	1,000
1.8	Compaction factor apparatus (to determine the workability of concrete)	1	10,000
1.9	Vee-Bee apparatus (to determine the workability of concrete)	1	20,000
1.10	Platform weighing machine	1	10,000
1.11	Concrete cube moulds	12 each	10,000

Sr . No.	Item	Qty	TentativeTotal Cost (Rupees)
1.12	Concrete mixers	1	50,000
1.13	Sieve shaker	1	10,000
1.14	Set of sieves	2 set	15,000
1.15	Beam mould	2	10,000
1.16	Impact testing machine	2	10,000
1.17	Needle vibrator	1 each	20,000
1.18	Flakiness index apparatus	1	1,500
1.19	Elongation index apparatus	1	1,500
1.20	Bar bending and cutter apparatus	1 set	2,000
1.21	Bulk density apparatus	1	2,000
1.22	Wire basket	2	500
1.23	Riffle sampler	2	1,000
1.24	Table vibrator	2	25,000
1.25	Concrete test hammer	1	25,000
1.26	Ultrasonic pulse velocity apparatus	1	1,50,000
B. ROADS AND SOILS LABORATORY			
1.1	Ring and Ball apparatus (with heating mantle)	1	1,500
1.2	CBR apparatus with loading machine	1	30,000
1.3	Flash point and fire point apparatus (Cleaveland type)	1	7,000
1.4	Los angles Abrasion testing machine apparatus	1	14,000
1.5	Water bath(Thermostatically controlled)	1	5,000

Sr . No.	Item	Qty	TentativeTotal Cost (Rupees)
1.6	Aggregate impact value testing apparatus with automatic blow counter	1	5,000
1.7	Penetration value apparatus with timer	1	13,500
1.8	Viscometer Capillary type		
1.9	Ductility machine	1	20,000
1.10	Direct shear test apparatus	1	15,000
1.11	Drying oven(Thermostatically controlled)	1	8,500
1.12	Electronic balance	1	15,000
1.13	Standard penetration test equipment	1	15,000
1.14	Soil exploration equipment (Augers etc)	1	1,500
1.15	Sand replacement method apparatus	1	2,000
1.16	Liquid limit and plastic limit apparatus	1	2,000
1.17	Compaction apparatus using light compaction (Proctor Test)	2	3,000
1.18	Grain size distribution test apparatus (sieve set)	1	5,000
1.19	Sieve shaker	1	5,000
1.20	Permeability apparatus	1	12,000
1.21	Proctor penetrometer	1	2,500
1.22	Core cutter apparatus	1	2,000
1.23	Rapid moisture meter	1	2,500
1.24	Pycnometer with burette	6	1,500
1.25	Liquid limit apparatus (Cone penetrometer method)	1	500

Sr . No.	Item	Qty	TentativeTotal Cost (Rupees)
2.	Name of Laboratory : SURVEY EQUIPMENT AND STORES		
2.1	Plane Table with stand and accessories	16	24,000
2.2	Dumpy level, quick setting level and engineers level		
	i) Dumpy level	8	17,000
	ii) Quick setting level	8	18,000
	iii) Engineer' level	1	5,000
2.3	Transit theodolite(Vernier type)	12	1,80,000
2.4	Prismatic compass	15	10,000
2.5	Planimeter	5	26,000
2.6	Lavelling staves(All aluminium)	5	20,000
2.7	Micro Optic Theodolite	1	55,000
2.8	Ranging rods	60	06,000
2.9	Pantagraph	2	02,000
2.10	Optical square	5	02,000
2.11	Abney level	5	03,000
2.12	Tangent clinometer (Indian Pattern)	5	03,000
2.13	Mirror stereoscope	1	02,500
2.14	Telescopic Alidade	2	03,000
2.15	Prismatic binoculars	1	04,500
2.16	Matric chain	10	03,000
2.17	Metallic taps/Fibre glass	20	04,000
2.18	Tentage, camp equipment and other misc. items and instruments	LS	50,000

Sr . No.	Item	Qty	TentativeTotal Cost (Rupees)
3.	Name of the Laboratory: HYDRAULICS AND IRRIGATION LABORATORY		
3.1	Hydraulic Bench	5	85,000
3.2	Impact of Jet apparatus	1	07,000
3.3	*Flow measurement apparatus by Venturimeter and Orificemeter	1	07,000
3.4	*Pipe Friction apparatus	1	09,000
3.5	*Orifice and Mouthpiece apparatus	1	09,000
3.6	*Bernoulli's Theorem apparatus	1	06,500
3.7	*Flow over a notch apparatus	1	09,000
3.8	*Losses in pipe bends apparatus	1	07,000
3.9	Reyonold's apparatus	1	05,000
3.10	Working models of:		
	- Pelton wheel Turbine	1	40,000
	- Francis Turbine	1	40,000
	- Reciprocating pump	1	18,000
	- Centrifugal pump	1	19,000
	- Hydraulic Ram	1	10,000
	- Kaplan turbine	1	40,000
3.11	Manometers of different types and pressure gauges like:		
	- Piezometer	6	500
	- Differential Manometers (Double column type manometer)	10	02,000
	- Universal manometers (Single column type manometer)	2	03,000
	- Inclined tube manometer	2	500
	- Bourden pressure gauges	2	01,500
	- Compound Gauges(Vacuum and pressure gauge combined)	2	01,500
*	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	04,000
3.13	Centrifugal pump test Rig.	1	27,000

Sr . No.	Item	Qty	TentativeTotal Cost (Rupees)
3.14	Submergible pump set apparatus	1	08,000
3.15	Misc.for tools etc.	LS	01,500
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	05,000
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	05,000
4.3	Plumber tools, plumbing vice, die and tap sets, pipe wrenches of different sets sizes, pipe cutters, spanner sets, hammer plier.	5	10,000
4.4	Centering, shuttering and scaffolding (for an ordinary residential building)	1 set	15,000
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	10,000
4.6	Hoisting and conveying equipment tripod, hoist, pulleys, ladders, ballis etc.	LS	20,000
4.7	Compressed air equipment with accessories	1	10,000
4.7	Steel fabrication equipment with fabricating small trusses, reinforcement cages, small girder,column beam connections, column truss connection	1 set	05,000
4.9	Floor grinding/polishing machine, spray guns etc	LS	05,000
5.	Name of the Laboratory: ENVIRONMENTAL ENGINEERING LABORATORY		
5.1	Lovibond comparator (for colour determination)	1	07,000
5.2	Colorimeter (for colour determination)	1	06,500

Sr . No.	Item	Qty	TentativeTotal Cost (Rupees)
5.3	Centrifuge	1	03,000
5.4	Turbiditimeter	1	05,000
5.5	pH meter	1	06,500
5.6	Jar test apparatus (Flocculator)	1	08,000
5.7	Dissolved oxygen meter	1	09,000
5.8	B.O.D incubator	1	16,000
5.9	Water bath with digital controller	1	03,500
5.10	Hot air oven	1	12,000
5.11	Hot plate	2	02,000
5.12	Bacteriological incubator	1	01,500
5.13	Colony counter	1	01,000
5.14	Water sampler	1	01,000
5.15	Water analysis kit	1	01,000
5.16	Water distill	1	05,000
5.17	Conductivity meter	1	05,000
5.18	Electronic balance	1	26,000
5.19	Chemical Balance	2	08,000
5.20	Inverted microscope	1	07,000
5.21	Model of oxidation ditch	1	15,000
5.22	Working model of Trickling Filter	1	14,000
5.23	Misc. Items like noise measurement apparatus etc.	LS	10,000

NOTE:I

In addition to above laboratories in respect of physics, chemistry, applied mechanics, strength of materials, general engineering, 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.

9.1.3 Furniture Requirement

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

9.2 Human Resources Development:

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 technician staff

Qualification	Experience
<u>Lecturer</u> First class B.E./B.Tech in Civil Engineering or equivalent	NIL
<u>Sr.Lecturer</u> First class B.E./B.Tech in Civil Engineering or equivalent	5 years experience in teaching/industry/research at the level of Lecturer or equivalent
<u>Head of Department</u> M.E./M.Tech in Civil Engineering or equivalent with first class at Masters or Bachelor's level	5 years experience in teaching/industry/research at the level of Lecturer or equivalent
<u>Note:</u> Candidates from industry/profession with B.E./B.Tech in Civil 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.	
<u>Technician</u> 3 years diploma in Civil Engineering or equivalent	2 years practical experiences in teaching/industry/research at appropriate level

10. RECOMMENDATIONS FOR EFFECTIVE IMPLEMENTATION OF CURRICULUM

The following recommendations are made for effective implementation of this curriculum.

- a) While imparting instructions, stress should be laid on the development of practical skills in the students.
- b) Field visits be organized as and when required to clarify the concepts, principles and practices involved. For this purpose, time has already been provided in student centred activities
- c) Extension lectures from professionals should be organised to impart instructions in specialised areas
- d) There is no need of purchasing very costly equipment. Efforts may be made to establish linkages with local industries/field organizations
- e) Considerable stress should be laid on personality development of the student, which is very essential for any diploma holder
- f) Teachers should generate competitiveness among the students for the development of professional skills.
- g) Teachers should take interest in establishing linkages with industries and field organizations for imparting field experiences to their students
- h) Hobby clubs and other co-curricular activities be promoted to develop creativity in the students
- i) Teachers should be sent for training in the new areas relevant to their field of specialization
- j) Students should be given relevant and well thought out project assignments. This will help students in developing creativity and confidence in them for gainful employment (wage and self)
- k) A **project bank** should be developed by the Civil Engineering department of the polytechnic in consultation with construction industry.

11. LIST OF PARTICIPANTS

The following experts participated /contributed in the revision of curriculum for diploma programme in Civil Engineering during the workshop for revision of first year for Haryana state held on 23-24 April, 2003 at National Institute of Technical Teacher's Training and Research, Chandigarh.

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