

9. RESOURCE REQUIREMENTS

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, drawing halls, laboratories, space required for faculty, student amenities and residential area for staff and students.

9.1.2 Equipment requirement

For three year diploma programme in Ceramic Engineering for student intake of 40 following laboratories and workshops are required corresponding to the curriculum structure suggested by the expert group:

- i) Physics Laboratory
- ii) Chemistry Laboratory
- iii) Mechanical Engineering Laboratory
- iv) Unit Operation Laboratory
- v) Electrical, Electronics Laboratory
- vi) Fuels and Furnaces Laboratory
- vii) Ceramic Machinery Laboratory
- viii) Whiteware Technology Laboratory
- ix) Refractory Technology Laboratory
- x) Glass Technology Laboratory
- xi) Computer Laboratory
- xii) Basic Workshop; Forging; Fitting and Assembly; Carpentry; Welding; Electrical Shop; Molding; Turning; Milling; Advanced Fitting; Grinding; Advanced Machine Shop.

The equipment required for laboratories/workshops for (i), (ii), (iii), (v), (xi) and (xii) will be as per the standard list approved by All India Council for Technical Education (AICTE) Equipment/Machinery requirement for laboratories/workshops needed for plastic technology course is given on the following pages.

UNIT OPERATION AND FLUID MECHANICS LABORATORY

Sr.	Particulars	Unit (One Each)
1.	Ball Mill	
2.	Mixer	
3.	Triple roll mill	
4.	Air Compressor	
5.	Jaw Crusher	
6.	Cyclone Separator	
7.	Plate and frame filter press	
8.	Sieve shaker	
9.	High vacuum pumps	
10.	Packed column	
11.	Agitating equipment	
12.	Ball falling in liquids apparatus	
13.	Particle setting in fluids	
14.	Sedimentation apparatus	
15.	Filter press	
16.	Friction pipe	
17.	Weirs, channels, v-notch	
18.	Centrifugal pumps	
19.	Viscometer	
20.	Rotameter, manometer	
21.	Globe valve	
22.	Gatevalve	
23.	Reynolds measuring apparatus	

FUELS AND FURNACES LABORATORY

24.	Moisture Measuring Equipement. (Moisture Meter)	1
25.	Bomb Calorimeter	1
26.	Orsat Apparatus	1
27.	Electric Heater	1
28.	Electronic Weighing Balance	1
29.	Physical Balance (1kg capacity)	1
30.	Dry Oven	1
31.	Flash Point Apparatus	1
32.	Red wood or Torsion Viscometer	1
33.	Chemical Balance	1
34.	Glass Ware (Lumpsum)	1
35.	Silica Dishes	Lump-sum
36.	Tongs (Stainless Steel)	1 dozen
37.	Alumina & Chrome thermocouple	2
38.	Laboratory Tables	6
39.	Steel Almirahs	2
40.	Thermometer	2
41.	Muffle furnace (up to 1000° C)	1

CERAMIC MACHINERY LABORATORY

42.	Ball Mill	1
43.	Jaw Crusher	1
44.	Magnetic Separator	1
45.	Fitter press	1
46.	Jigging & Jollying Apparatus	1
47.	Hydraulic Press	1
48.	Toggle press	1

WHITE WARE TECHNOLOGY LABORATORY

49.	Muffle furnace (up to 1200° C	1
50.	Trays of different size	-
51.	Troughs, bargins, Mugs, Measuring Jars	-
52.	Casting mould for cup, flower pot etc	-
53.	Pot Mill	-
54.	Sieve Shaker and Standard Sieves set	1
55.	Spray gun	1
56.	Auto clave	1
57.	Tile cutting machine	1
58.	Drying oven	1
59.	Electronic Balance	1

GLASS TECHNOLOGY LABORATORY

60.	Electric Furnace (1450°C)	1
61.	Silica Crucible	100
62.	Platinum Tipped Tong (20 cm long)	One dozen
63.	Platinum Crucibles (50 ml cup each)	One dozen
64.	Platinum dishes (150ml cup each)	2
65.	Blowing machine	1
66.	Strain viewer	2

REFRACTORY TECHNOLOGY LABORATORY

67.	Cold crushing strength testing machine	1
68.	Modulus of rupture apparatus	1
69.	P.C.E. furnace	1
70.	R.U.L. Furnace	1
71.	Spalling test equipment	1
72.	Hard operated press	1
73.	Vernier calipers and scales	1
74.	Andreson and pippet Apparatus	1
75.	Flame photometer	1
76.	Spectroscopy	1
77.	X-ray diffractometer	1

9.1.3 Furniture requirement

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

9.2 Human Resources

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

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 Ceramic Engineering department of the polytechnic in consultation with Ceramic Industry, Ceramic Research Institutes and other important Ceramic institutions in the state.

11. LIST OF PARTICIPANTS

The following experts participated/contributed in the revision of curriculum for diploma programme in **Ceramic Engineering** during the workshop for revision of subjects of first year for Haryana state held on 15th May, 2003 at National Institute of Technical Teachers' Training and Research, Chandigarh.

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4. Mrs. Rama Chhabra, Senior Lecturer, IMCO
5. Mrs. Poonam Likhi, Assistant Professor, Curriculum Development Centre **(Coordinator)**

The following experts participated/contributed in the revision of curriculum for diploma programme in **Ceramic Engineering** during the workshop for revision of complete Curriculum for Haryana state held from 12 – 14 November, 2003 at National Institute of Technical Teachers' Training and Research, Chandigarh.

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