Lesson Plan

Name of Faculty : : MD. MANAZIR EQBAL

Discipline : CERAMIC ENGINEERING
Semester : FOURTH
Subject : WHITEWARE TECHNOLOGY
Lesson Plan Duration : 16 WEEKS
Work Load (Lecture/Practical) per week in hours : Lecture : 3 Practical 4

Week	Theory		Practical	
	Lecture Day	Topic (Including assignment/test)	Practical Day	Topic
1	1	Introduction and classification : Definition , Brief History ,	1	Introduction of all practicals of ceramic whiteware technology.
1	2	Classification of White ware , Division of Pottery: Terracotta, Earthenware, Stone ware , Porcelain and Chemical Porcelain ware	2	Moisture content in china clay / given sample
1	3	Introduction of Raw Materials: Naturally occurring Raw Materials Clay, Ball and Fire Clay		Moisture content in china clay / given sample
2	4	Quartz, Nepelene Syenite		Determination of water of plasticity of clay.
2	5	Talc, Sillimanite, Sand stone , Wallastonite ,	1	Determination of water of plasticity of clay
2	6	Zircon, Boneash, /synthetically prepared Manterials Alumina,	2	
3	7	Zirconia, Beryllia		Determination of loss on lgnition .
3	8	Additives : Organic Liquids, Water , Flocculants, De flocculants,		Determination of loss on lgnition .
3	9	Binder, Lubricants	1	
4	10	Unit II Body prepation process- Methods of Batch Calculation (Batch Recipe, Chemical Composition)	2	Determination of fineness of various raw materials used for whiteware bodies

Week	Lecture		Practical	
	Day	Topic	Day	Topic
4	11	Unloding and Storage, Crushing and Grinding,		Determination of fineness of various raw materials used for whiteware bodies
4	12	Batch mixing, Blunging, Ball milling , Mixing,		
5	13	Agitating, Magnetising, Sieving, Pumping	1	Particle size distribution of powder granules.
5	14	Filtration (Dewatering), Pugging and Batting	2	Particle size distribution of powder granules.
5	15	Porcess of body prepration (For shaping) : (a) Dry and Semidry Powder (B) Plastic mass		
6	16	(c) Slip		
6	17	Sessional Test 1	1	Flow and rolling limit of clay bodies
6	18	(a)Pessing (pressure fabrication) (i) Dry pressing (ii) Semidry Pressing (iii) Hot pressing, (iv) isostatic pressing	2	Flow and rolling limit of clay bodies
7	19	(b)Plastic forming: Jiggering and Jollying, extrusion, Hand Moulding, injection moulding. Throwing.		Identify different formimg methods .
7	20	(c) Slip Casting: Detailed study of slip casting , Theoretical concept about slip casting , zeta potential, double layer formation,		Identify different formimg methods .
7	21	Role of electrolytes, deflowcculants. Different types of casting –(i) Ordinary of Natch casting (ii) Bench casting (iii) Battery casting	1	
8	22	(iv) Capillary casting . (d) Finishing operation; sponging, Smoothing	2	Preparation of different bodies and their glazes .
8	23	Jointing or stickup. Mould Materials: -Mould materials and their properties		Preparation of different bodies and their glazes
8	24	(Different Types of dies and mould),		
9	25	Process of mould making using POP.	1	Fabrication of test specimen by different process by casting and jiggering .
9	26	Process of Removal of water,		Fabrication of test specimen by different process by casting and jiggering .
9	27	Importance of drying Factors affecting drying rate time, Drying shrinkage		
10	28	Methods of drying, Stages of drying, Critical moisture content		**Study of defects in drying process in dry oven.**

Week	Theory		Practical	
	Lecture Day	Topic (Including assignment/test)	Practical Day	Topic
10	29	Types of dries-batch & continuous,		**Study of defects in drying process in dry oven.**
10	30	Hot floor(through steams pipes Chamber driers & tunnel driers etc. Defects in drying)		
11	31	Glaze prepration Storing and application of glaze		**Determination of linear drying shrinkage (LDS) of clay body .**
11	32	Sessional test-2		**Determination of linear drying shrinkage (LDS) of clay body .**
11	33	Precautions and methods of setting wares in kilns.		
12	34	Firing: Definition, stages of firing and firing schedules,		**Biscuit and glost firing of test pieces .**
12	35	Different types of firing;Biscuit firing, Glost firing,Decoration firing,		**Biscuit and glost firing of test pieces .**
12	36	Different types of kilns- Batch and Continuous.		Study of heating & colling schedule .
13	37	Kiln Furniture,Placing of wares in kiln.		Study of heating & colling schedule .
13	38	Defects in whiteware bodies and glazes :- Crawing, pinholes, peeling, crazing, spit-out dunting, blistering, sulphering		Determination of firing shrinkage of clay body.
13	39	Rolling, chipping and their records		Determination of firing shrinkage of clay body.
14	40	Removal of water, Factors affecting drying, Hot flow, Steams pipes		Determination of water absorption of fired Ceramic products.
14	41	Hot flow, Steams pipes, Chamber driers & tunnel driers, Defects in drying		Determination of water absorption of fired Ceramic products.

14	**42**	Revision of unit 5, Effect of heat on clay, qutarz, Effect of heat on Feldspar, Barium carbonate.		MOR (strength) of fired characteristics of test specimens.
15	**43**	Effect of heat on Talc, Bentonite, Effect of heat on ceramic bodies Firing of bone-china bodies,		MOR (strength) of fired characteristics of test specimens.
15	**44**	Different types of firing kilns, Shuttle kiln, Down draft kiln , Continuous kiln		Examine the crazing of the given sample by using Autoclave machine.
15	**45**	Revision		Examine the crazing of the given sample by using Autoclave machine.