TEACHING & EVALUATION SCHEME

DISCIPLINE : CERAMIC TECHNOLOGY

SEMESTER - VI

S I N o .	Subject	Evaluation Scheme							Total Marks
					Theory		Practical		
	Theory	**L**	**P**	End Exam	**Internal Assessment**		**End Exam**	**Sessional**	
					Class Test	**Assignment**			
1	Entrepreneurship & Industrial Mgt.	4	-	70	20	10	-	-	100
2	pollution control in ceramic Industry	4	-	70	20	10	-	-	100
3	Modern Ceramic	4	-	70	20	10	-	-	100
4	Ceramic Composites And Nano Ceramic	4	-	70	20	10	-	-	100
5	Elective 1. Technology of Cement 2.oxide,non-oxides ceramics and ceramic composites	4	-	70	20	10	-	-	100

PRACTICAL

1	Ceramic Klin & Product Drawings	-	3	-	-	-	25	25	50
2	Ceramic Testing – IV	-	6	-	-	-	25	25	50
3	Project Work	-	7	-	-	-	25	75	100
4	Technical seminar	-	3	-	-	-	25	25	50
	TOTAL	20	19	350	100	50	100	150	750

Note : Evaluation for I.A (Theory) & Sessional Practical to be made as per guidelines of SCTE&VT

ENTREPRENEURSHIP & INDUSTRIAL MANAGEMENT

Total Periods	: 60	Full Marks	: 70(Th)+ LA 30 (I)
Periods Per week	: 04	Time	: 3 hours

(COMMON TO ELECT. ECT, AE&I, MECH,AUTO,CSE,CPA,MET, CHEM, TEX, CER, FT)

TOPLCWISE DISTRIBUTION OF PERIODS

Sl. No.	Topic	Periods
1.	Concept of Organisation & Enterprise Management	08
2.	Entrepreneurship & Management of S.S.I. s	14
3.	Financial Accounting & Cost Control	09
4.	Stores & Financial Management	09
5.	Production Management	03
6.	Sales & Marketing Management	03
7.	Human Resource Management	04
8.	Industrial Sickness	04
9.	The Factories Act 1948	05
10.	Workmen's Compensation & Payment of Wages Act	08
11.	Industrial Dispute Act	04
12.	Trade Union Act	04

RATIONALE

The course intends to provide the fundamental aspects of entrepreneurship as a means for self employment. Management functions, in an organization, coordinates various resources to allow the manufacturing activities to continue on a sustained basis. It is essential that the diploma engineers are given an exposure industrial activities.

Various statutory rules acts and regulations have been instituted in Indian by Central/State Govt. to ensure that the workmen are not exploited and they can they can earn their livelihood with respect. As a supervisor . manager has to work in an industry under binding of such rules and acts, they should have a fair idea of such rules / acts / regulations.

OBJECTIVES

On Completion of the course the student will be able to :

1. Understand the concept of different forms of organisation & Management function.
2. Explain the role of an entrepreneur in industrial environment & detailed idea on SSI and various related aspects.
3. Learn about financial accounting and cost control.
4. Know the different areas of management relating to stores & finance, production, sales & marketing and human resource in he organisation.
5. Understand about the industrial sickness & its remedies.
6. Have a comprehensive idea on some important legislations relating to factory, workmen's compensation, payment of wages, industrial disputes and trade union.

COURSE CONTENT

1. **Concept of Organisation & Enterprise & Management.**
   1.1 Define & state the features of Business.
   1.2 Explain the components of Business.
   1.3 Sate the feature of different forms of Business Organisation.

   1.4 Define Management & different Management with Administration.
   1.5 Discuss the functions of Management.
   1.6 Discuss the principles of 'Scientific Management'.
   1.7 Explain organisation structure and delegation of authority & responsibility.
   1.8 State the principles of a sound organisation.

2. **Entrepreneurship & Management of S.S.I. s**
   2.1 Define and state the meaning of 'Entrepreneurship'.
   2.2 Discuss the entrepreneurial characteristics
   2.3 Explain the role of an entrepreneur in industrial development .
   2.4 Define S.S.I. , Ancillary , Tiny, Cottage, Medium, & Large scale Industrial .
   2.5 Explain the features of SSI.
   2.6 Discuss the criteria for selection of SSI.
   2.7 Prepare a preliminary & detailed project report of a SSI.
   2.8 Enumerate the incentives available to SSI as per IPR.
   2.9 State the inputs required for setting up a SSI.
   2.10 Discuss the institutional support to SSI at Sate and National level. (OSEC, OSIC, IPICOL, IDCO, SIDBI, IDBI, ICICI & Commercial Banks)

3. **Financial Accounting & Cost Control.**
   3.1 State the different types of Accounts & explain the double entry system of book keeping.
   3.2 Explain Journal , Ledger, Trial Balance & Cash Book.
   3.3 Explain the components of Final Accounts and Balance sheet.
   3.4 Define Cost and explains its elements.
   3.5 Prepare a simple cost sheet.
   3.6 Explain cost – volume – profit relationship & break – even – point.

4. **Stores & Financial Management**
   4.1 State the procedures involved in purchasing
   4.2 Explain the centralized & decentralized purchasing.
   4.3 State the meaning & important of Inventory control.
   4.4 Explain the different stores records – Bin Card, Stores Ledger & Goods Received Note etc.
   4.5 State the meaning & importance of Financial Management in context with S.S.I.
   4.6 Explain the types of capital – Fixed & Working.
   4.7 Discuss briefly the components of Working Capital Management .

5. **Production Management**
   5.1 State the importance of Production, Planning, & Control.
   5.2 Discuss the steps involved in Production Planning, & Control.

6. **Sales & Marketing Management**
   6.1 Discuss the importance of sales & marketing management.

6.2 Mention & explain different selling methods.
6.3 Explain the product policy briefly
(Types of Product, Packaging, Branding, Pricing, Cost Plus pricing, Variable Pricing policy, Price strategy.)
6.4 Enumerate the techniques of sales promotion.
6.5 Explain Advertising & its media.

7. Human Resource Management

7.1 Mention the different sources of recruitment.
7.2 Explain the different methods of selection.
7.3 Discuss the different training methods.
7.4 State the need of performance appraisal

8. Industrial Sickness.

8.1 Define & explain the meaning of Industrial sickness
8.2 State the cause of sickness.
8.3 Explain the remedial measures to avoid Industrial Sickness.

9. The factories Act.

9.1 State the meaning & objectives of factories Act.
9.2 Outline the various provisions related to Health, Safety, Welfare, Hours of Work, Holidays , Wage , employment of Women , Accidents, Diseases, Penalties & Procedures.
9.3 Explain the duties of Factory Inspector

10. Workmen's Compensation & Payment of Wages Act.

10.1 State the rules regarding Workmen's Compensation.
10.2 Explain the employees liability for compensation
10.3 State the obligations and rights of employer.
10.4 Give the meaning of Payment of Wages Act.
10.5 State the different rules for payment of minimum wages.
10.6 State the provision of E.P.F & E.S.I.

11. Industrial Dispute Act

11.1 Outline the objects & Meaning of Industrial Dispute Act.
11.2 State the causes of Industrial Dispute.
11.3 Enumerate the machinery set up for settlement of Industrial Disputes
11.4 Explain the measures for prevention of Industrial Disputes.

12. Trade Union Act.

12.1 State the meaning & functions of Trade Union
12.2 Explain the features of Trade Union Act 1926.

Books Recommended :

1. Industrial Engineering & Management – O.P. Khana
2. Entrepreneurial Development – Gupta & Srivastay.
3. Small Scale Industry – Vasant Desai
4. Business Orgainsation – Sharma & Gupta.
5. Principles & Practice of Management – L.M. Prasad
6. Entreprencurship for Engineers – B. Badhei.
7. Industrial Law – N.D. Kapoor.

POLLUTION CONTROL IN CERAMIC INDUSTRY
(Theory-2)

Total Contact Hrs : 60 Total Marks :100
Theory Exam : 3 Hrs.
Theory : 4 periods/week End
Term Exam :70
I.A. :
20 + 10 =30

Objectives : After completion of study of environment engineering and pollution control, the student will able to

1. Aware air, water, noise pollution and its control
2. Solid waste management and hazardous waste and their effects.
3. Understand methods of pollution control and their standards.
4. Know disaster management.
5. To know about industrial safety.
6. Understand the safety aspects in ceramic industries.

Sl. No.	Major Topics	Periods
1	Air Pollution	10
2	Water Pollution	10
3	Pollution Control in industries	10
4	Environment Management	10
5	Industrial Safety	10
6	Safety In Ceramic Industries	10

COURSE CONTENTS :

1.0 **AIR POLLUTION** :

1.1 State and explain air pollution
1.2 Compositions of air,
1.3 Nature of air pollution and its effect on environment
1.4 Sources of air pollution and quality of air.
1.5 Pollution problems in different Ceramic Industries and its control.
1.6 Effect of Air pollution on human being, air born diseases and control of air pollution.
1.7 Classify air pollution control equipments and explain their functions.

2.0 **WATER POLLUTION**

2.1 State and explain water pollution.
2.2 Water pollution by industrial wastes and its effect on environment and on human being.
2.3 Evaluate and classify different waste with reference to different ceramic industry.
2.4 Describe different water pollution parameters.
2.5 Quality of water and testing of water.

3.0 **POLLUTION IN CERAMIC & ALLIED INDUSTRIES & ITS CONTROL**

3.1 Noise pollution in ceramic and other industries.
3.2 Effect of noise pollution and its control.
3.3 Water and Air pollution by ceramic and other allied industries.
3.4 Soil pollution due to various industries and its control.
3.5 Role of pollution control board.
3.6 Pollution control laws in India .

4.0 **ENVIRONMENTAL MANAGEMENT & DISASTER MANAGEMENT**

4.1 Solid waste management
4.2 Waste water Management
4.3 Disaster Management
4.4 Disaster Mitigation
4.5 Environmental management system I.S.O. fourteen thousand. (Introduction only)

5.0 INDUSTRIAL SAFETY

5.1 Introduction to industrial safety
5.2 Occupational health and safety management
5.3 Accident and its control
5.4 Industrial hazards, toxicity and its control
5.5 Safety equipments
5.6. Role of organization for industrial safety

6. 1 Different types of hazards in ceramic industries and its control
6 .2 Accident,its causes in ceramic industries
6 3. Safe work practice while working in ceramic kiln and furnace.
6.4 Safety in use of ceramic machines
6.5 Occupational health problems and its control in ceramic industries.

Book Recommended:

1. Industrial safety R. K. Jain, Sunil S. Rao
2. Fundamentals of Industrial Safety K.U. Mistry
3. Environmental Chemistry – A.K. De.
4. Air Pollution – M.N. Rao
5. Environmental Engineering – Raw & Pearvy
6. Environmental Pollution Control by Wiely.

MODERN CERAMIC
(Theory-3)

Total Contact Hrs : 60 Total Marks :100

Theory Exam : 3 Hrs.

Theory : 4 hours/week
End Term Exam :70
Practical : Nil
I.A. : 20 + 10=30

(Fundamental idea only)

Objectives : After completion of course student will be able to

1. Know about latest development of ceramic in various area.
2. Know uses of electrical and electronic ceramic for engineering purpose .
3. Know various abrasive products and there uses
4. know ceramic material systems and ceramic composites and their application
5. Know bio-ceramic products and their application.
6. Understand application of special ceramics

Sl. No.	Major Topics	Periods
1	Classification of Special Ceramic	05
2	High Temperature ceramic material	10
3	Electrical ceramics	10
4	Electronic ceramic	10
5	Mechano-ceramic	10
6	Engine ceramics	05
7	Bio Ceramics	10

COURSE CONTENTS :

1.0 **CLASSICIZATION OF SPECIAL CERRAMICS**

- 1.1 Define spécial ceramic
- 1.2 Classification of Spécial Ceramic
- 1.3 Importance of Spécial Ceramic

2.0 **HIGH TEMPERATURE CERAMICS**

- 2.1 Introduction of High Temperature Ceramics.
- 2.2 Explain the properties and application of oxide Ceramics.
- 2.3 Explain the properties and uses of carbide, boride,nitride ceramics
- 2.4 Advance Ceramic Materials & Components for Automobile Engines.
- 2.5 Ceramic heating elements

3.0 **ELECTRICAL CERAMICS**

- 3.1 Dielectric ceramics, properties & application.
- 3.2 Ferro Electric and pyroelectric ceramics, piezo electric ceramic products, their properties & application.
- 3.3 Low loss ceramics and their application
- 3.4 High and low tension electrical porcelain their manufacturing and application.

4.0 ELECTRONIC CERAMICS

4.1 Introduction to electronic ceramic
4.2 Application and properties of electronic ceramic
4.3 Method of manufacturing of electronic ceramic products
4.4 Soft and hard ferrites. properties and application
4.5 Manufacturing of magnetic ceramics

5.0 MECHANO-CERAMICS

5.1 Abrasive materials and abrasive grain
5.2 Manufacturing of abrasive grain and its application
5.3 Ceramic grinding and cutting wheel.manufacturing and application.

6.0 ENGINE CERAMICS

6.1 introduction to engine ceramics
6.2 Ceramic for automobile
6.3 Characteristics of engine ceramic products.
6.4 Spark plug and its manufacturing

7.0 BIO- CERAMICS

7.1 Define Bio Ceramics
7.2 Special ceramic for Biological Use & their characteristics.
7.3 Bio Materials, bio glass & bio composites for medical application.
7.4 Ceramic implants.
7.5 Ceramic for artificial teeth

Books :

1. Industrial Ceramics By Singer & Singer
2. Introduction to Ceramics by W.D. Kingery
3. Ceramic material for Electronics By Heneb & West.
4. Special ceramic by popper
5. Magnetic ceramic by Richerson
6. Abressive- Coes L Jr.
7. Cutting Tools- R. Edwards.
8. Encyclopedia of advance ceramic material- R. J. Brook
9. Non-oxide Technical & Engg. Ceramics – S. Hampshire.
10. Ceramic matrix Composites - R. Warren.
11. Ceramic materials for Electronics- Marcel Dekker.

CERAMIC COMPOSITES AND NANO CERAMIC

VI- SEM- CER

Theory-4

Total Contact Hrs : 60
Theory-
4hrs/week

Total Marks :100

Theory Exam :
3Hours

End Term Exam :70
I.A. : 20 + 10=30

Objectives :

1. Know about latest development of ceramic in various are
2. Understand the nano ceramic application in various field
3. Know about ceramic composite and their application
4. Know about glass ceramic products and theie uses
5. Understand fibre reinforced glass properties and uses
6. Know about cermet and its application

Sl. No.	Major Topics	Periods
1	Ceramic Composites	15
2	Glass Ceramics	15
3	Fibre-reinforced glass	10
4	Cermet	10
5	Nano Ceramics	10

COURSE CONTENTS

1. 0 CERAMIC COMPOSITES

1.1 Defination and classification of composites
1.2 Fibres and whiskers and their use as composite
1.3 Ceramic matrix composites,properties and application
1.4 Alumina and mullite matrix composites and its applicatio
1.5 Silicon carbide matrix composite
1.6 Carbon-Carbon composite

2.0 GLASS CERAMIC

2.1 Introduction to glass ceramic
2.2 Glass ceramic matrix composites
2.3 Manufacturing of glass ceramic
2.4 Properties & application of glass ceramic composites

3.0 FIBER REINFORCED GLASS

3.1 Introduction to glass fiber & fiber glass
3.2 Portland cement glass fiber composite
3.3 Properties & uses of glass fiber composite

3.4 Glass reinforced gypsum, application & properties
3.5 Glass reinforced polymer, properties & application

4.0 CERMET

4.1 Introduction to cermet
4.2 Various cermet products
4.3 Manufacturing of cermet
4.4 Properties & uses of cermet

5.0 NANO CERAMICS

5.1 Introduction to nano materials & nano technology
5.2 Introduction to nano ceramics
5.3 Nano ceramic products
5.4 Nano ceramic composite
5.5 Introduction to advance ceramic coating
5.6 Nano ceramic coating
5.7 Engineering application of nano ceramic

Books

Encyclopedia of advance ceramic material-R. J. Brook
Non oxide technical & engg ceramics –S. Hampshire
Ceramic matrix composites –R. Wareen
Ceramic materials for electronics-Marcel Dekker
Advance technical ceramics by – Shigeyuki Somiyag

TECHNOLOGY OF CEMENT (Elective)

VI- SEM- CER

Total Marks : 100

Theory Exam : 3 Hrs
End Term Exam : 70
I.A.: 20+10

Objectives :

After completion of the course, students will be able to :

1. Know lime and lime stone, their qualities, calcinations and cementing property.
2. Understand details about Portland cement.
3. Understand manufacturing of various types of cement, their qualities
4. Know about cement kiln and its operation
5. Know various methods of testing qualities of cement.
6. Know various types of cement concrete products and its manufacturing process.
7. Know details about Gypsum, plaster of paris and plaster products.

Sl.No.	Major Topics
1	Lime and Other Hydraulic Materials
2	Portland Cement
3.	Various Types of Cement
4.	Testing of Cement
5.	Cement Products
6.	High Alumina Cement

COURSE CONTENTS

1. LIME AND OTHER HYDRAULIC MATERIALS

1.1 Define various terms related to lime and lime stone
1.2 State & explain properties of lime stone
1.3 Impurities of lime stone and its effect in cements
1.4 Explain calcinations and slaking of lime stone
1.5. Pozzalanic materials & its utilization in cement
1.6. Fly ash and slag for cement making.

2.0 PORTLAND CEMENT : Discuss the following details :-

2.1 Introduction to OPC
2.2 Raw Materials for OPC, Their properties and effect on cement making.
2.3 Manufacturing Process of OPC
2.4 Rotary Kiln and its operation (RCK)
2.5. Vertical shaft kiln and its operation for OPC.
2.6 Clinker formations and clinker chemistry
2.7. Hydration of cement & Setting of Cement.
2.8. Effect of acid water and sulphate water on cement
2.9. Effect of alkalis, sulfur compound of OPC.
2.10. Various types of Accelerator and retraders used in cement.
2.11 Properties of cement, 43 grade and 53 grade OPC
2.12 Constituents of cement clinker, grinding of clinker
2.13. Storage of cement
2.14. Dust controlling in cement industry

2.15 Impurities in cement and their effect.

3.0 VARIOUS TYPES OF CEMENT:

Describe the composition, quality, property and making of the following cement:-

3.1	Pozzuolana Cement	3.11	Oil well cemem
3.2	Blast Furnace slag cement	3.12	Sorel cement
3.3	Acid Resistant Cement	3.13	Hydrophilic Cement
3.4	Masonary Cement	3.14	Expanding Cement
3.5	Sulphate Resisting and Super Sulphate Cement	3.15	Low heat cement
3.6	Rapid Hardening Cement		
3.7.	Quick Setting Cement		
3.8.	High alumina Cement		
3.9.	White Cement		
3.10	Coloured Cement		

4.0. TESTING OF CEMENT:

Discuss the following testing methods for cement in brief.

4.1 Consistency of cement
4.2 Initial and Final setting of Cement.
4.3 Expansion of Cement
4.4 Compressive & Tensile Strength.
4.5 Particle size of cement
4.6 Impurities in Cement
4.7 Specific gravity of cement.
4.8 Chemical analysis of cement.

5.0. CEMENT CONCRETE PRODUCTS:

5.1 Describe various cement concrete products used in low cost housing
5.2 Explain various types of ferro-cement products.
5.3 Describe making of mosaic tiles.
5.4 Describe making of cement concrete (RCC) pipes & Railway slipper.
5.5. Describe making of cement concrete Block
5.6 Making of FAL-G Brick

6.0 High Alumina Cement(HAC): -

6.1. Introduction
6.2 Raw materials used for manufacturing of HAC
6.3 Manufacturing process
6.4 Hydration Chemistry & Properties
6.5 Use of HAC

Book Recommended:-

1. Chemistry of Cement - Bouge
2. Chemistry of Cement and Concrete – F. M.Lea.
3. Cement – Mukherjee
4. Multi functional cement based materials by Marcel Decker (Inc 2003)
5. Structure and performence of cement by J. Bensted & P. Barnes.

OXIDE, NON OXIDE CERAMICS AND CERAMICS COMPOSITIONS (ELECTIVE)

L	T	P
4	0	0

Total Contact Hrs : 60
Theory : 4hrs/week

Total Marks :100

Theory Exam : 3 Hrs.
End Term Exam :70
I.A. : 20 + 10=30

Objectives :

After completion of this course, students will be able to

1. know various s Oxide Ceramics, non-oxide ceramics and ceramics Composites.
2. know the various application of the above special ceramics.
3. know the general idea on the production of above special ceramic products.

Sl.No.	Major Topics	Periods
1	Oxide Ceramics	30
2	Non Oxide Ceramics	30
3	Ceramic Composites	15

COURSE CONTENT

1.0 OXIDE CERAMICS

1.1 Introduction to crystal structure

1.2 Structure of Oxide ceramics

1.3 Describe the manufacturing method, properties and application of the following in brief.

a. Al_2O_3
b. Mullite
c. Cr_2O_3,
d. MgO
e. $MgO-Cr_2O_3$
f. $MgO-Al_2O_3$
g. TiO_2
h. ZrO_2
i. ZrO_2-SiO_2
j. $MgO-SiO_2$ ceramics

NON OXIDE CERAMICS

2.1 State and explain the following non oxide ceramics.

2.2 Testing, properties and application of the following non-oxide ceramics

2.2.1 Carbides

2.2.2 Nitrides

2.2.3 Silicides

2.2.4 Borides

3.0 CERAMIC COMPOSITES

3.1 Classify ceramic composites.

3.2 Describe influence of microstructure on properties of composites.

3.3 State and explain constitute of composites.

3.4 Describe Portland cement glass fibre composites, oxide ceramics.

3.5 Explain fibre glass reinforced gypsum, organometallic compounds in brief.

3.6 Describe manufacture , properties, application and testing of composites in brief.

Books recommended

1. Industrial ceramics by Singer and Singer
2. Structural ceramics by J.B Watchman.
3. Electro ceramics by Edited by A.J. Manison and Other BIC, U.R.
4. Introduction to Technical ceramics by B. Wave

CERAMIC KILN & PRODUCT DRAWING

Total Contact Hrs : 45
Theory : Nil
Practical : 3 hours/week

Total Marks :50

Practical Exam. : 4 Hrs.
Sessional : 25 Marks
End Exam : 25 Marks

Objectives : After taking this course the student will be able to :

i) sketch and draw to measurement various furnace, kin.
ii) sketch and draw various electrical insulators, tableware, sanitary wares and mould of various product.
iii) sketch and draw symbols of equipment used in ceramic and chemical industries.
iv) represent a process with the help of flow charts.

COURSE CONTENTS

1. Draw different types of shapes used in furnace construction.
2. Furnace / Kiln drawing – Draw the following
   i. Down draft kiln.
   ii. Tunnel Kiln.
   iii. Muffle kiln.
   iv. Chamber Kiln.
3. Draw various types of
   a. Electrical insulators
   b. Tableware
   c. Sanitary wares and mould of various products.
4. Sketch symbols of Equipment used in ceramic and chemical industries.
5. Plant lay out of various ceramic industries.

Book s:

1. Industrial ceramics by Singer and Signer.
2. Outline of chemical engineering.
3. Refractories by Chesti.
4. Refractories by Nandi.

CERAMIC TESTING – IV

Total Contact Hrs : 90
Theory : Nil
Practical : -6hours/week

Total Marks :50

Practical Exam. : 4 Hrs.
Sessional : 25 Marks
End Exam : 25 Marks

SECTION-A

(Minimum five number of Tests to be practiced)

CHEMICAL ANALYSIS OF CERAMIC RAW METERIALS AND PRODUCTS.

1. Sampling
2. Determine of loss on Ignition.
3. Opening of sample by fusion for analysis
4. Estimate of SiO_2.
5. Estimate of Al_2O_3
6. Estimate of TiO_2
7. Estimate of Fe_2O_3
8. Estimate of CaO
9. Estimate of Mgo
10. Analyse of Glaze, enamel and frits.
11. Analyse of Clay
12. Estimation of hardness of water using EDTA.

SECTION-B

1. Preparation of sample for micro structure studies.
2. To study microstructure of ceramic product
3. To study spectrophotometer.

PROJECT WORK

Total Contact Hrs : 105
Theory : Nil
Practical : -07
Period per weak:-

Total Marks :100

Practical Exam. : 4 Hrs.
Sessional : 75 Marks

End Exam : 25 Marks

Rational:- Assignment of a project involving a selected ceramic engineering operation will give an opportunity to study individually the requirement of setting up of a ceramic engineering operation starting preparation process flow diagram, plant layout, design requirement for processing equipment, process safety, provision for effluent treatment etc.

The object of the project is to make use of the knowledge gained by the student at various stages of the diploma course. Thus helps to judge the level of proficiency, originality and capacity for application of knowledge attained by the student at the end of the course. Project work is a team work, the students may be divided into different groups or may be in a single group depending upon the type of project work to be carried out. For the final exam the project shall be assessed by the viva voce examination to be conducted by the external examiner at the end of the year. Each student must give a seminar talk of 15 to 30 minutes duration. Each group should submitted printed copy of the project report. Each staff member of the department should guide one group of students. Any of the topics related to ceramic technology may be chosen for the project work.