
 MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI TEACHING AND EXAMINATION SCHEME FOR POST H.S.C. DIPLOMA COURSES																	
COURSE NAME : DIPLOMA IN SURFACE COATING TECHNOLOGY																	
COURSE CODE : SC																	
DURATION OF COURSE: SIX SEMESTERS										WITH EFFECT FROM 2014-15							
SEMESTER : FIRST										DURATION : 16 WEEKS							
PATTERN : FULL TIME - SEMESTER										SCHEME : G							
SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (19100)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
								Max	Min	Max	Min	Max	Min	Max	Min		
1	English \$	ENG	17101	03	--	02	03	100	40	--	--	--	--	25@	10	50	
2	Applied Chemistry	ACH	19117	03	--	03	03	100	40	50 [#]	20	--	--	25 [@]	10		
3	Technology of Resins - I	TOR	19118	03	--	03	03	100	40	--	--	--	--	50 [@]	20		
4	Technology of Pigments - I	TOP	19119	03	--	03	03	100	40	50 [#]	20	--	--	25 [@]	10		
5	Computer Fundamentals \$	CMF	17002	01	--	04	--	--	--	50 ^{#*}	20	--	--	25 [@]	10		
TOTAL				13	--	15	--	400	--	150	--	--	--	150	--	50	
Student Contact Hours Per Week: 28 Hrs. THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH. Total Marks : 750 @ Internal Assessment, # External Assessment, \$ Common to All Conventional Diploma, #* Online Examination, No Theory Examination.																	
Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Termwork, SW- Sessional Work ➤ Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW). ➤ Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms. ➤ Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.																	

 MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI TEACHING AND EXAMINATION SCHEME FOR POST H.S.C. DIPLOMA COURSES																	
COURSE NAME : DIPLOMA IN SURFACE COATING TECHNOLOGY																	
COURSE CODE : SC																	
DURATION OF COURSE: SIX SEMESTERS										WITH EFFECT FROM 2014-15							
SEMESTER: SECOND										DURATION: 16 WEEKS							
PATTERN : FULL TIME - SEMESTER										SCHEME : G							
SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (19200)
				TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
								Max	Min	Max	Min	Max	Min	Max	Min		
1	Communication Skills \$	CMS	17201	02	--	02	03	100	40	--	--	25#	10	25@	10	50	
2	Industrial Chemistry	INC	19224	03	--	03	03	100	40	25#	10	--	--	25@	10		
3	Safety in Coating Industry	MCI	19225	03	--	02	03	100	40	--	--	--	--	25@	10		
4	Technology of Resins-II	TOR	19226	03	--	03	03	100	40	--	--	25#	10	25@	10		
5	Technology of Pigments - II	TOP	19227	03	--	03	03	100	40	--	--	--	--	25@	10		
6	Development of Life Skills \$	DLS	17010	01	--	02	--	--	--	--	--	25#	10	25@	10		
TOTAL				15	--	15	--	500	--	25	--	75	--	150	--	50	
Student Contact Hours Per Week: 30 Hrs. THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH. Total Marks : 800 @ Internal Assessment, # External Assessment, \$ - Common to All Conventional Diploma, No Theory Examination.																	
Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Termwork, SW- Sessional Work																	
<ul style="list-style-type: none"> ➤ Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subject are to be converted out of 50 marks as sessional work. ➤ Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms ➤ Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code. 																	

Course Name : All Branches of Diploma in Engineering and Technology.

**Course Code : AE/CE/CH/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/
ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI/DC/TC/TX/FG/AA/SC/FC/
PC/PN/HM/TR**

Semester : First

Subject Title : English

Subject Code : 17101

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

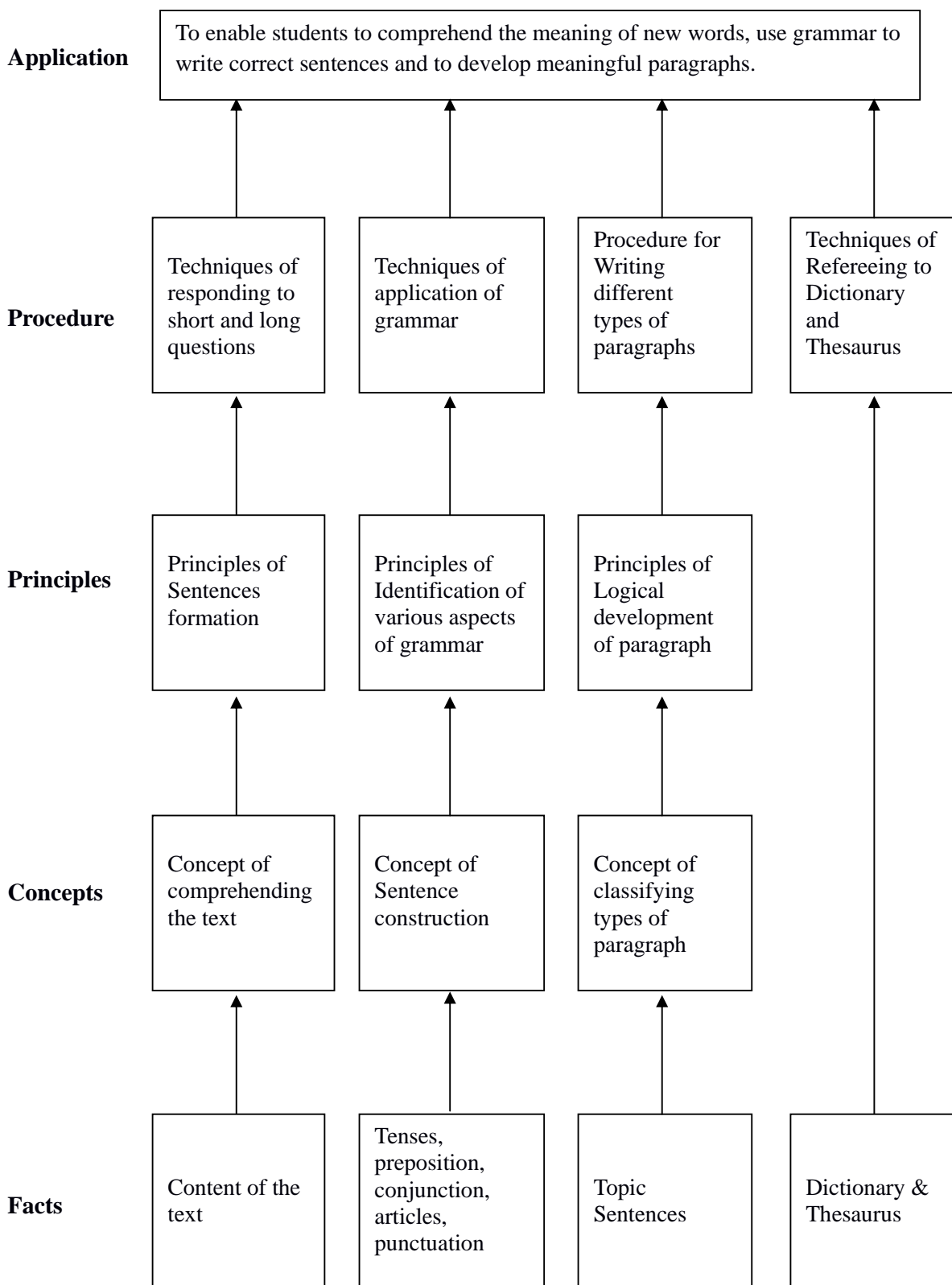
The most commonly used medium to express oneself is language. English, being a global language, is used in all the spheres of human life i.e., personal, professional and social. A diploma student is expected to be proficient in English language and pursue the existing course of study to handle the future jobs. The content of the text includes the aspects related to language skills.

General Objectives:

Students will be able to;

1. Develop vocabulary.
2. Apply the rules of grammar.
3. Comprehend the given unseen passage.

Learning Structure:



Contents: Theory

Topic and Contents	Hours	Marks
<p>PART I - Application of Grammar</p> <p>Specific Objective:</p> <ul style="list-style-type: none"> ➤ Apply grammatical rules to form correct sentences. <p>Contents:</p> <ul style="list-style-type: none"> ▪ Articles: Appropriate use of definite and indefinite Articles ▪ Prepositions: To use correct Prepositions as per context ▪ Conjunctions: Co-ordinating and sub-ordinating Conjunctions ▪ Tenses: Correct usages of past, present and future tenses ▪ Active and Passive voice: Use of Active and Passive voice ▪ Direct and Indirect sentences: Conversion of direct into indirect sentence and vice versa 	12	24
<p>PART II – Text</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Answer the questions based on the articles ➤ State the meanings of the given words from the articles <p>Contents:</p> <ul style="list-style-type: none"> ▪ Articles 	20	32
<p>PART III - Paragraph Writing</p> <p>Specific Objective:</p> <ul style="list-style-type: none"> ➤ Write a paragraph on a given topic <p>Contents:</p> <ul style="list-style-type: none"> ▪ Paragraph Writing: Elaborate and expand the ideas with cohesion, coherence and use of correct punctuation marks ▪ Types of Paragraph: Narrative, Descriptive, Technical, Comparison and Contrast ▪ Dialogue Writing: Based on various situations ▪ Speech Writing based on situations: Welcome Speech, Farewell Speech, Vote of Thanks and Introducing a Guest 	06	16
<p>PART IV – Comprehension</p> <p>Specific Objective:</p> <ul style="list-style-type: none"> ➤ Comprehend and provide the answers on given passages <p>Contents:</p> <ul style="list-style-type: none"> ▪ Comprehension of Passage: Comprehending questions and writing the answers on unseen passages 	04	12
<p>PART V- Vocabulary Building</p> <p>Specific Objective:</p> <ul style="list-style-type: none"> ➤ Use correct words in given situations <p>Contents:</p> <ul style="list-style-type: none"> ▪ Words Often Confused 	06	16

<ul style="list-style-type: none"> ▪ Collocation ▪ Prefix and Suffix ▪ Synonyms and Antonyms 		
Total	48	100

Skills to be developed in practicals:**Intellectual Skills:**

1. Select appropriate words/verbs and formulate correct sentences
2. Develop ability of correct pronunciation
3. Report writing skills

Assignments:

Journal consists of the following assignments:-

1. Punctuate 25 sentences given by the teacher.
2. Rewrite the passage/passages with correct form of verbs. [Teacher is expected to give passage /passages of verbs used wrongly [at least 25 verbs.]
3. Write 15 synonyms and 15 antonyms with the help of the thesaurus.
4. Write a paragraph each on descriptive, narrative, comparison, contrast and technical type in 75 to 100 words.
5. Write 10 words of prefixes and 10 words of suffixes and use them in sentences.
6. Select one news from any English newspaper. The news may be from any one of the following areas – Social, environmental, financial, economics, sports, etc. Prepare a summary of the news and make it presentable by using relevant photographs/graphics.
7. Students will be given ten collocations, develop three sentences for each collocation.

NOTE: The following assignment should be performed in the Language Laboratory/with the help of interactive media.

8. Listen and practice the dialogues with the help of interactive media/ interactive software.

Learning Resources:

Sr. No.	Title	Author	Publisher
1	MSBTE TEXTBOOK	-----	MSBTE
2	ESSENTIAL ENGLISH GRAMMAR	RAYMOND MURPHY	CAMBRIDGE
3	HIGH SCHOOL ENGLISH GRAMMAR AND COMPOSITION	WREN AND MARTIN	S CHAND & CO.

Course Name : Diploma in Surface Coating Technology
Course Code : SC
Semester : First
Subject Title : Applied Chemistry
Subject Code : 19117

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER Hrs.	TH	PR	OR	TW	TOTAL
03	--	03	03	100	50 #	--	25@	175

NOTE :

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of test marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

This subject will help comprehend the fundamentals of Chemistry and the students will familiarize with various raw materials, testing through analysis and their applications in Surface Coating Technology.

Objectives:

The students will be able to

1. Apply knowledge of volumetric and gravimetric analysis to the analytical work of core technology and technology subjects.
2. Select proper chemicals for core technology.
3. Identify the uses & application areas of acids, alcohols aldehydes, keton
4. Understand the concept of Polymerization, methods of polymerization & its effect on the properties of polymer

Learning Structure**Applications**

Understanding the problems of organic compounds errors in measurements of volumes and calculations

Procedures

Studying the compounds like alcohols, ketones, carboxylic acids, measurement of volume and detection of end point & calculations.

Principle

Understanding the problems in the studying organic compounds errors in measurements of volumes and calculations

Concepts

Oxidation and reduction reactions, esterification. Amino derivatives, volumetric analysis

Facts

alcohols, ketones, carboxylic acids, carbonic acids, amines etc

Contents: Theory

Topic and Contents	Hrs.	Marks
<p>Topic 1: Volumetric & Gravimetric Analysis</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define terms: atomic weight, molecular weight, equivalent weight, molarity & molality ➤ Explain the methods of Volumetric & Gravimetric analysis <p>Contents:</p> <p>1.1 Volumetric Analysis – Marks: 10</p> <ul style="list-style-type: none"> • Basic Concepts, definition & role of Atomic wt., Molecular weight & equivalent wt. of materials, molar solutions, molal solutions and normality of solutions, redox titrations • Preparation of Solutions- Primary & Secondary Standards, Indicators, choice of Indicators, calculation in volumetric analysis <p>1.2 Gravimetric analysis: Marks: 10</p> <p>Introduction, Principle, Solubility & solubility products, wash liquid & technique for washing & drying precipitate, analytical methods used in gravimetric analysis, fusion of compounds, loss on ignition (burning residues)</p>	10	20
<p>Topic 2: Acids, Alcohols & Esters</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define & describe acids, alcohols & esters. ➤ Explain the process of esterification process with properties & uses of acetates & benzoates <p>Contents:</p> <p>2.1 Acids: Properties & uses of Marks:16</p> <p>Introduction to acids, alcohols, esters & homologous series & properties and uses of: Acetic Acid, Succinic acid, Maleic Acid & Anhydride, Fumaric acid, Benzoic Acid, Phthalic Acid & anhydride.</p> <p>Alcohols: Properties & uses of</p> <p>Methyl alcohol, ethyl alcohol, Butanol, Isopropyl alcohol, ethylene glycol, DEG, glycerol and Pentaerythritol, Sorbitol</p> <p>2.2 Esters: Properties & uses of- Marks: 04</p> <p>Ethyl Acetate, Ethyl Glycol acetate, Ethyl benzoate</p>	09	20
<p>Topic 3: Aldehydes & Ketones</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe aldehydes, ketone groups & their properties ➤ Explain homologous series of these groups & their general properties ➤ Explain commonly used aldehydes & Ketones in paint industries <p>Contents:</p> <p>3.1 Aldehydes: Properties & uses of Marks: 10</p> <p>Aldehydes & Ketones & their homologous series. Properties and uses of Formaldehyde, Acetaldehyde</p> <p>3.2 Ketones: Properties & uses of Marks: 10</p> <p>Acetone, Methyl Ethyl Ketone and Methyl Iso butyl Ketone and their use in paint formulations</p>	09	20

<p>Topic 4: Polymerization</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe the types of monomers, their functionality & effect on formation of polymers ➤ Explain the effect of molecular weight & its effect on degree of polymerization ➤ List out & explain different polymerization methods & polymers used in coating Industry <p>Contents:</p> <p>4.1 Chemistry of Polymer: Marks: 08 Definition and concept of functionality, effect of functionality to polymers, molecule, molecular weight (No. and weight average) and degree of Polymerization of polymers</p> <p>4.2 Polymerization Marks: 12 Polymerization reaction: Addition, condensation, convertible & non-convertible polymers, thermoplastics & thermosetting polymers, linear, branched & complex polymer and their characteristics.</p> <p>Methods of Polymerization: Mass polymerization, Solution Polymerization, Dispersion Polymerization & Emulsion Polymerization.</p>	10	20
<p>Topic 5: Physical Properties of Materials (Pigments, Resins, Solvents) and their Significance:</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define & describe physical properties of raw materials used in paints ➤ Demonstrate significance of these tests on final properties on paint & coatings ➤ Predict the final properties of paint based on test of materials <p>Contents:</p> <p>5.1 Resin, Solvents & Additives: Marks: 10 Density, refractive Index, Surface Tension, Viscosity & rheology, Melting point, Boiling Point, Softening Point, compatibility among resins and solvents, Glass transition temperature & Distillation range.</p> <p>5.2 Pigments & Extenders: Marks: 10 Colour, density, bulk density, refractive index, pH, acidic & alkaline pigments & their effect on paint composition, solubility & reactivity In chemicals, loss on ignition, water content, moisture content, particle size.</p>	10	20
Total	48	100

Practical:**Skills to be developed:****Intellectual Skills:**

1. Understand Molecular weight, equivalent weight, Normal solution and strength of solutions
2. Identify types of reactions
3. Describe mentally experimental set-up, conduct observations and inferences.
4. Manipulate optimum conditions of reactions.

Motor Skills:

1. Clean glass - ware, weigh and measurements, setting of glass-wares for experiments.
2. Manipulate optimum conditions of Reaction
3. Observe, read and record readings.

List of practical: (Minimum 10 experiments to be completed)

1. Prepare 0.1 N HCl and 0.1 N NaOH and standardization.
2. Prepare 0.1 N KMnO_4 and standardization.
3. Determine the amount of ferrous sulphate in the given solutions.
4. Determine the amount of Glycerol in the given solution.
5. Determine the amount of Formaldehyde in the given solution.
6. Determine the amount of Acetone in the given solutions.
7. Prepare a sample of Methyl Orange & study its use as Indicator.
8. Carry out Color test for Urea and Thiourea: M. and color reaction.
9. Determine amount of Sodium Carbonate /bicarbonate in mixture of solution.
10. Determine the amount of sodium carbonate/hydroxide in mixture of solution.
11. Determine the amount of ester in the given solution.
12. Determine Loss of Ignition of a compound gravimetrically.
13. Determine the purity of zinc oxide/zinc chrome pigment.
14. Determine pH of various solutions and pigments.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
1.	Peter Sykes	Guide book to mechanism in Organic Chemistry	Orient Longman Ltd.
2.	Bahl & Tuli	Essentials of Physical Chemistry	S Chand & Co.
3.	L. H. Gadgil & D. B. Kulkarni	A Text Book of Chemistry	Narendra Prakashan, Pune
4.	B S Bahl & Arun Bahl	Text Book of Organic Chemistry	Narendra Prakashan, Pune
5.	V K Ahluwalia, Sudhan Raghav	Comprehensive Experimental Chemistry	New Age International Publisher

Course Name : Diploma in Surface Coating Technology
Course Code : SC
Semester : First
Subject Title : Technology of Resins - I
Subject Code : 19118

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER Hrs.	TH	PR	OR	TW	TOTAL
03	--	03	03	100	--	--	50@	150

NOTE :

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of test marks for all theory subjects are to be converted as out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

This subject will explain the importance of resin as a vehicle, medium, binder, film forming material and polymer. It will explain the basic chemistry, manufacturing processes and properties of resins. The subject will explain the behavior induced by resin in the particular paint and thereby affecting the performance of paint application and after application, during life cycle of paint.

General Objectives:

The students will be able to

1. Understand and describe natural and synthetic resins.
2. Describe manufacturing processes and properties of resins.
3. Identify application areas of various types of resins in coatings.

Learning Structure :**Applications**

Understanding and getting familiarized with the properties of resins in the manufacture of paints and inks.

Procedures

Mixing and processing of raw materials and conditions controlling process parameters temperature, duration etc. for getting desired quality of resins.

Principle

Selection of raw material, selection of processing methods and the knowledge of controlling parameters.

Concepts

Concept of polymerization, esterification, addition and condensation etc in the preparation of resins,

Facts

Raw materials such as oil, natural resins, varnishes, lacquers, alcohols, acids, aldehydes, solvents etc., Manufacturing equipment such as kettles mixers etc.

Contents: Theory

Name of the Topic	Hrs.	Marks
<p>Topic 1: Introduction Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Name the binders, their origin & types ➤ Classify resins as per their properties ➤ Explain the mechanism of drying of Oils & oil based binders <p>1.1 Introduction to Binders: Marks:10 Define Binders, common terminology used, Classification of binders such as Convertible & non-Convertible. Thermoplastic & thermosetting binders. General properties of Resins/binders, Common examples according to classification</p> <p>1.2 Oils as Binder / Media: Marks: 10 Classification of oils: Types of Oils e.g. Linseed, Castor and DCO, Safflower Oil, Rice bran Oil, Coconut oil as Drying, semi drying, nondrying oils. Drying mechanism of Oil based Binders, Uses of Oils in paints and varnishes, concept of oil length in binders.</p>	09	20
<p>Topic 2: Natural & Oleo-resins Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe different types of Natural resins & their properties ➤ Explain modification of Rosin to more suitable forms by different methods ➤ Explain the properties & uses of less used resins <p>2.1 Natural Resins (Rosin): Marks: 10 Preparation, properties and uses of Rosin, Ester Gum, Calcium Hardened Rosin, Maleic hardened Rosins, glycerol and Penta esters; Oleo – resinous varnishes, modified resins, Preparation, properties and uses of OR varnishes. Shellac – properties and uses of shellac in coatings</p> <p>2.2 Other Resins: Marks : 10 Classification, Properties and uses of less used resins like, Hydro carbon resins, terpenes, Bituminous compounds Gilsonite, Rafetite, Coal tar pitch.</p>	09	20
<p>Topic 3: Synthetic Resins Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe different raw materials and method of synthesis of Alkyd Resin ➤ Explain the properties, uses & application areas of Alkyd & polyester resins ➤ Explain types of Alkyd modified products, Polyesters & their properties & uses <p>3.1 Alkyd Resins: Marks: 10 Classification of synthetic resins, Raw Materials, formulation parameters and Manufacturing methods, Properties and uses of resins, Modified alkyd resins like Rosinated, styrenated and acrylated alkyds,</p> <p>3.2 Polyester Resins: Marks: 10 Classification and structure of Polyester resins, Saturated and Unsaturated Polyesters resins, comparison with oil modified alkyd resins, role of Styrene in polyesters as a reactive solvent, Raw</p>	10	20

Materials, Manufacturing , Properties, uses & curing agents		
<p>Topic 4: Amino & Phenolic Resins</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe different raw materials and method of synthesis of Amino Resin ➤ Explain the properties, uses & application areas of amino & modified amino resins ➤ Explain types of Phenolic & phenolic modified products their properties & uses <p>4.1 Amino Resins (UF & MF) : Marks: 10 Classification, Chemistry, Properties and uses of Amino resins , comparison of urea formaldehyde and melamine formaldehyde and formaldehyde resins</p> <p>4.2 Phenolic Resins (PF Resins): Marks : 10 Types, Properties and uses of PF resins, P/F ratio and it's significance; Resol, Novolac and oil soluble resins, modified phenolics in Oleoresinous varnishes.</p>	10	20
<p>Chlorinated Rubber:</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe different raw materials and method of synthesis of Chlorinated rubber ➤ Explain the properties, uses & application areas of rubber paint ➤ Explain types of miscellaneous resins their properties & applications <p>5.1 Chlorinated Rubber: Marks: 10 Process of Chlorination for rubber, preparation of lacquers & evaluation of properties, properties of chlorinated rubbers & its application areas, compatibility of chlorinated rubber with other synthetic resins</p> <p>5.2 Miscellaneous Resins: Marks: 10 Properties and uses of resins based on CNSL, Nitrocellulose. Other binders like Water soluble glues and proteins in binders</p>	10	20
Total	48	100

Practical: Skills to be developed:

Intellectual Skills:

1. Identify required glass-wares.
2. Know the end point of various titrations.
3. Interpret the result analysis.

Motor Skills:

1. Handle analytical balance.
2. Measure the quantity accurately.
3. Set glass-wares for experiment, resin preparing equipment.

List of Practical Experiments: (Minimum 10 experiments to be completed)

1. Determine the acid value of samples of oils.
2. Determine the iodine value of samples of oils.
3. Prepare and test sample of Calcium rosinat.
4. Prepare and test sample Ester gum.

5. Prepare and test sample of Oleo-resinous varnish
6. Prepare and test Bituminous lacquer.
7. Prepare and test N.C. lacquer.
8. Test various properties of Alkyd resins.
9. Determine the free formaldehyde content of Amino resins.
10. Test the hydroxyl value of Phenolic resin.
11. Test properties of Phenolic, Maleic resins for M.P. compatibility with solvents, oils & alkyds.
12. Compare the properties of varnish and alkyd resins.
13. Test physio-chemical properties of Amino resins.
14. Check acid and alkali resistance of alkyd resins.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
1.	R. Sinha	Outlines of polymer Technology	Prentice Hall of India
2.	O C C A	Solvents , oils , resins & driers	Chapman & Hall
3.	O C C A	Convertible Coatings , Part III	Chapman & Hall
4.	H F Payne	Organic Coatings Vol.I	John Wiley & Sons
5.	W. M. Morgan	Outline of Paint Technology , Raw Materials	S.K.Jain for CBS Publisher & Distributor
6.	V. C. Malshe & Minal Sikchi	Basic Paint Technology, Part I	--

Course Name : Diploma in Surface Coating Technology
Course Code : SC
Semester : First
Subject Title : Technology of Pigment - I
Subject Code : 19119

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER Hrs.	TH	PR	OR	TW	TOTAL
03	--	03	03	100	50#	--	25@	175

NOTE :

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of test marks for all theory subjects are to be converted as out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rational:

This subject will give basic knowledge about pigments and their role in paints. This part- I of the subject will deal only with black and white pigments and extenders. This will make the students' grasping easier as this is a new technology for students. The subject will include the names of pigments, processing their properties and uses.

Objectives:

Students will be able to:

1. Appreciate use of Pigments in Coating Industries.
2. Understand & Classify pigments, their properties & uses in coatings.
3. Understand the properties of Pigments in the manufacture of points and allied coating materials.

Learning Structure:

Applications

Understanding and getting familiarized with the properties of pigments in the manufacture of paints and allied coating materials



Procedures

General methods of pigment manufacture, evaluation and comparison of properties of pigments as per Indian Standard specifications



Principle

Selection of pigments, and the knowledge of properties of pigment.



Concepts

Concept of grinding and dispersing techniques and significance of shade and grey scale



Facts

Pigments as opacifying agent. Black and white pigments.
Extenders as non opacifying and physicochemical controllers.

Contents: Theory

Topic and Contents	Hrs.	Marks
<p>Topic 1: Pigments Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the composition, properties, both chemical and physical for the pigments ➤ Differentiate good pigments from inferior ones ➤ Predict the choice of pigments <p>1.1 General Pigments: Marks : 10 Introduction, Definitions, classification of Pigments, Role of Inorganic and Organic pigments in coatings, Difference between pigments and extenders</p> <p>1.2 Pigment Specifications : IS 33 and 34: Marks : 10 General Properties & Evaluation of Pigments & Extenders as per IS 33 & 34</p>	10	20
<p>Topic 2: General Methods of Manufacturing of Pigments: Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe the raw materials for manufacturing of pigments ➤ Predict the basic composition and interpret the final behavior of pigments ➤ Describe the various steps used in manufacturing and their effect of the properties <p>2.1 Manufacturing: Marks :10 Stages Involved in the manufacturing of white Pigments. e.g. Dry and wet Grinding techniques, sieving & sampling of Pigments,</p> <p>2.2 Particle size: Marks :10 Concept of agglomerates/ individual particles/ agglomeration Survey of Pigment Industry in India</p>	08	20
<p>Topic 3: Extenders Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the source of extenders ➤ Describe the raw materials for manufacturing of extenders ➤ Predict the use of extenders & properties induced by them <p>3.1 Calcium, Magnesium & Barium: Marks :12 Properties and uses of : Calcium Carbonate, Dolomite, whiting, Barytes, Blanc Fixe</p> <p>3.2 Silicates extenders: Marks :08 Properties and uses of : China Clay, Silica, Talc, Alumina hydrate</p>	10	20
<p>Topic 4: White Pigments Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the composition, properties, both chemical and physical for true white pigments ➤ Describe the manufacturing process ➤ Differentiate between interior & exterior pigments <p>4.1 Titanium Dioxide Marks :10</p>	10	20

General manufacturing methods, Properties and uses of Anatase and Rutile pigments & their surface modification		
4.2 Other white Pigments: Marks: 10 Composition, Properties & uses of- Zinc Oxide , Zinc Phosphate , Lithopone, Antimony Oxide		
Topic 5: Black Pigments: Specific Objectives: ➤ Describe the various types of black pigments ➤ Describe the manufacturing process ➤ Differentiate between carbon & other black pigments		
5.1 Carbon black Pigments: Marks:10 Composition, Properties and uses of: Carbon Black pigments, types of carbon blacks, structure of carbon pigments, concept of structure of carbon pigments, difficulties associated dispersion of black pigments	10	20
5.2 Other black pigments: Marks:10 Black pigments like graphite pigments, Iron black, comparison of carbon with other black pigments, and their use as conductive materials.		
Total	48	100

Practical:**Skills to be developed****Intellectual Skills:**

1. Find out particle size, shape and texture of pigments.
2. Determine reducing power and opacity of pigments / extenders.
3. Conduct bleeding test.

Motor Skills:

1. Handle palette knife for mixing.
2. Operate automatic Muller for mixing.
3. Take draw-downs for comparative study of pigments.

List of Practical Experiments: (minimum 10 experiments to be completed)

1. Classify Properties of white pigments such as: particle size, texture, shape etc.
2. Determine properties such as Sp. Gr., Bulk Density of heavy pigments / extenders
3. Determine properties such as Specific Gravity, Bulk Density of black pigments
4. Determine residue on sieve of pigments / extenders
5. Determine moisture content in pigments
6. Determine oil absorption value of white pigments / extenders
7. Determine resistance to acid /alkali of white pigments and pH of water extract
8. Determine resistance to heat of pigments
9. Take draw down of pigments using Automatic Muller
10. Determine Reducing / coloring power of pigments
11. Demonstrate livering properties of Alumina hydrate
12. Compare opacity of extenders with that of pigments
13. Test bleeding tendency in pigments

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
1	T. C. Patton	Pigment Hand Book, Vol I & II	John Wiley & Sons
2	W. M. Morgan	Outlines of Paint Technology	Charles Griffin & CO.Ltd
3	Gunter Buxbaun	Industrial Inorganic Pigments	VCH Wiley Publishers
4	W Herbst & K Hunger	Industrial Organic Pigments	VCH Wiley Publishers
5	Swaraj Paul	Surface Coatings	John Wiley & Sons
6	V. C. Malshe & Minal Sikchi	Basic Paint Technology PART-I	--

Course Name : All Branches of Diploma in Engineering and Technology.

**Course Code : AE/CE/CH/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/
ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI/FE/IC/IE/IF/IS/IU/ME/
MH/MI/MU/PG/PS/PT/AA/SC/TR/FC/GT/PN**

Semester : First

Subject Title : Computer Fundamentals

Subject Code : 17002

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	04	--	--	50* #	--	25@	75

*** On Line Examination**

Rationale:

Since early 21st Century the use of Computer has been so rapidly that it is difficult to think of an area where computers are not being used. It is very desirable that everyone should have good knowledge of computer.

Main purpose of this subject is how to use a computer for basic needs. This subject covers application softwares like MS-Word, MS-Excel, MS- PowerPoint.

It is a gateway to wonderful world of information and part of various applications like business, academic, hospitals, construction, designing, chemical fields and many more.

Intellectual Skills:

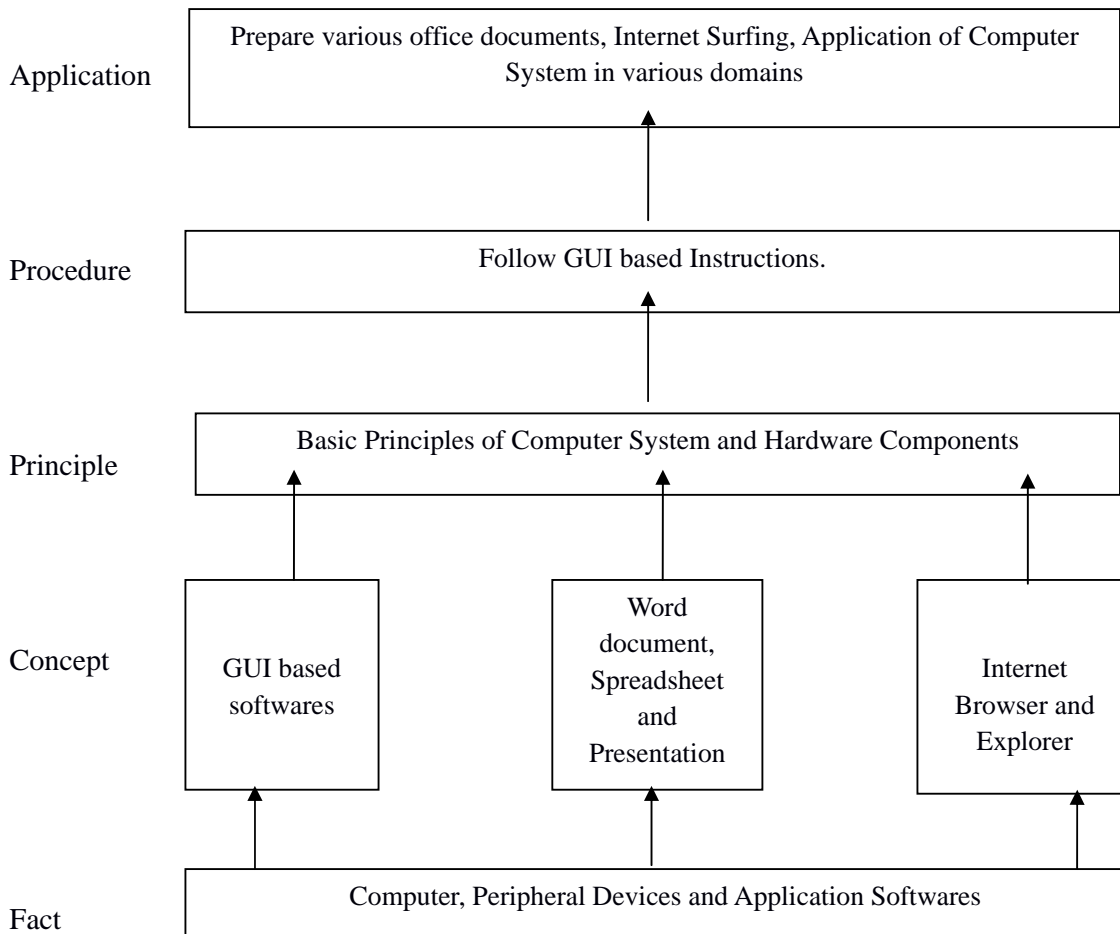
Students should be able to:

1. Use of Operating System.
2. Use MS- Word, MS-Excel, MS- PowerPoint, efficiently for documentation.
3. Use browser for accessing Internet.

Motor Skills:

Handle Personal Computer System.

Learning Structure:



Contents:**Note:**

1. It is suggested that the separate batch should be formed for students having less computer background.
2. Contents of theory are to be taught in practical period with the help of LCD projector.

Sr. No	Activity/Topics	Hours
1	<ul style="list-style-type: none"> • Algorithms-Introduction, Three Basic Operations, Procedures and Programs 	1
2	<ul style="list-style-type: none"> • Data Representation- Representing different symbols, minimizing errors, Representing more Symbols, Generic Formula, the ASCII code, the EBCDIC code, Rules of Decimal number System and its conversion to binary • Multimedia- Digital images, analog to digital conversions, digital audio and digital video 	2
3	<ul style="list-style-type: none"> • Binary Arithmetic- binary addition, binary subtraction, multiplication and division • Logic Gates- The need for derived gates, Half adder, Full adder, Logical operations 	2
4	<ul style="list-style-type: none"> • Data Storage- memory-Main Memory, Memory data transfer, MBR, Memory decoders -1x2,2x4...10x1024, MAR, Address, Data and Control Buses, Load and Store Instructions, Word and Word Length, RAM and ROM, Cache Memory • Data Storage- Disk- Memory Hierarchy, Disk basics – Cylinders, Tracks, Surfaces, Sectors, Relationship between logical and physical records, Disk Controller Architecture, Sector format, Formatting Process, Seek Time, Rotational Delay and Transmission time, The relationship between Application program, Operating System, Disk Controller and the actual disk, CDs, DVD • VDU and Printers-Human-computer interface, Keyboard, Raster Scanning, Frame Buffer, Basics of Graphics, Black and White/ Color Terminals, Text based terminals, LEDs/LCDs, Inkjet Printers, Laser Printer 	3
5	<ul style="list-style-type: none"> • Computer Architecture-CPU Registers, Multiplexers, ALU, Instruction Format, Instruction Decoding, Instruction Execution Cycles • Operating System-Concepts of system calls, Multiprogramming, Concepts of Context Switch, Different Services of Operating System, Information Management , Process Management (Process states, Process State Transition, Process Scheduling), Memory Management (Fixed Partition, Variable Partition, Paging, Demand Paging) 	2
6	<ul style="list-style-type: none"> • Classification of Computers and applications- Characteristics of Computers, What Computers can do, What computers can't do, Classification of Digital Computer Systems, Anatomy of a Digital Computer 	1

7	<ul style="list-style-type: none"> Introduction to Computer Usage of computer system in different domains like office, book publication, ticket reservation, banks etc. Components of PC - Mouse, keyboard, CPU, monitor, printers, scanners, modem, memory, sound cards, pen drives. 	1
8	<ul style="list-style-type: none"> Introduction to Operating System(Windows 7) Working with Windows desktop, icons, taskbar, menu bar options, My Documents, My Computer, Control Panel, Recycle bin Concept of drives, folders, files Windows accessories - Notepad, WordPad, paint, clock, calendar, calculator 	1
9	<ul style="list-style-type: none"> GUI Based Software – MS – Office 2010 MS-Word - Opening menus, toolbars, opening and closing documents, clipboard concept MS - Excel - Working and manipulating data with excel, formulas, functions, chart and its types MS - PowerPoint - Working with PowerPoint and presentation ,Changing layout, Graphs , Auto content wizard ,Slide show, Animation effects, Normal, outline, Slide sorter, Reading view. 	2
10	<ul style="list-style-type: none"> Internet History of Internet, equipments required for Internet connection, browser (Internet Explorer, Mozilla and Firefox, Google Chrome) 	1
Total		16

List of Practicals / Activities

Sr. No	Practicals / Activities
1	<ul style="list-style-type: none"> Demonstration of above peripheral devices to students
2	<ul style="list-style-type: none"> Moving from one window to another window Opening task bar buttons into a window. Arranging icons on the desktop and create shortcuts.
3	<ul style="list-style-type: none"> Creating folders and files. Copy, rename, delete files and folders. Moving folders and files from one drive to another drive.
4	<ul style="list-style-type: none"> Create and edit notepad document. Create and edit WordPad document. Create paint file by using different drawing tools.
5	<ul style="list-style-type: none"> Creating, editing, saving word document. Entering and formatting text. Paragraph formatting, use bullets and numbering. Page formatting – page margins, page size, orientation, page break, headers and footers. Create tables, insert, and delete rows and columns. Printer installation and printing document. Create and print mail merging address for envelop and letters.
6	<ul style="list-style-type: none"> Create, open and print worksheet with page setup and print options. Enter data and format cells. Select, insert, delete cells, rows and columns.

	<ul style="list-style-type: none"> • Insert formulas, functions and named ranges in worksheet. • Create chart of different types.
7	<ul style="list-style-type: none"> • Create a simple text slide using formatting, Selecting a slide layout. And insert pictures & backgrounds. • Insert auto shapes, clip-arts and form group/un group objects from slides. Apply slide transitions and slide timings and animation effect for slide show
8	<ul style="list-style-type: none"> • Perform Internet connection. • Create own e-mail id, send and receive mail with attachment. • Searching information using search engine (Google, MSN, bing etc.) • Do Internet chatting and understand the chat toolbar. • Organize favorite websites in different browsers.

Learning Resources:**1. Books:**

Sr. No	Author	Title	Publisher
1	Achyut Godbole	Demystifying Computer	TMH
2	Alexis Leon	Introduction to Computers	Vikas Publishing House
3	Vikas Gupta	Comdex Computer Course Kit (Windows 7 with Office 2010)	Dreamtech Press
4	Steve Schwartz	Microsoft Office 2010	Pearson
5	Elaine Marmel	Microsoft Project 2010 (Bible)	Wiley India
6	Preppernau Cox	Windows 7 Step by Step	PHI

2. Links:

1. <http://www.psexam.com>
2. <http://www.gcflearnfree.org/office>
3. <http://www.softwaretrainingtutorials.com/ms-project-2010.php>
4. <http://www.7tutorials.com>

List of Equipments/Tool:**Hardware Tools-**

1. Computer System (Pentium –IV or higher version)
2. Printer
3. Modem
4. Pen Drive

Software Tools-

1. Windows- 7 (Operating System)
2. MS-Office 2010
3. MS- Project 2010
4. Internet Explorer/Mozilla/Chrome/Firefox

Guidelines for Online Exam:

1. Total duration for online examination is an hour.
2. There will be theoretical multiple choice questions.
3. There will be certain practical performance based questions.

Course Name : All Branches of Diploma in Engineering & Technology

**Course Code : AE/CE/CH/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/
ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI/DC/TC/TX/AA/SC/FC/PN/
PC/ML/HM/TR**

Semester : Second

Subject Title : Communication Skills

Subject Code : 17201

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	--	02	03	100	--	25#	25@	150

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work (SW).**

Rationale:

In this age of globalization, competition is tough. Hence effective communication skills are important. Communication skills play a vital and decisive role in career development. The subject of Communication Skills introduces basic concepts of communication. It also describes the verbal, non-verbal modes and techniques of oral & written communication.

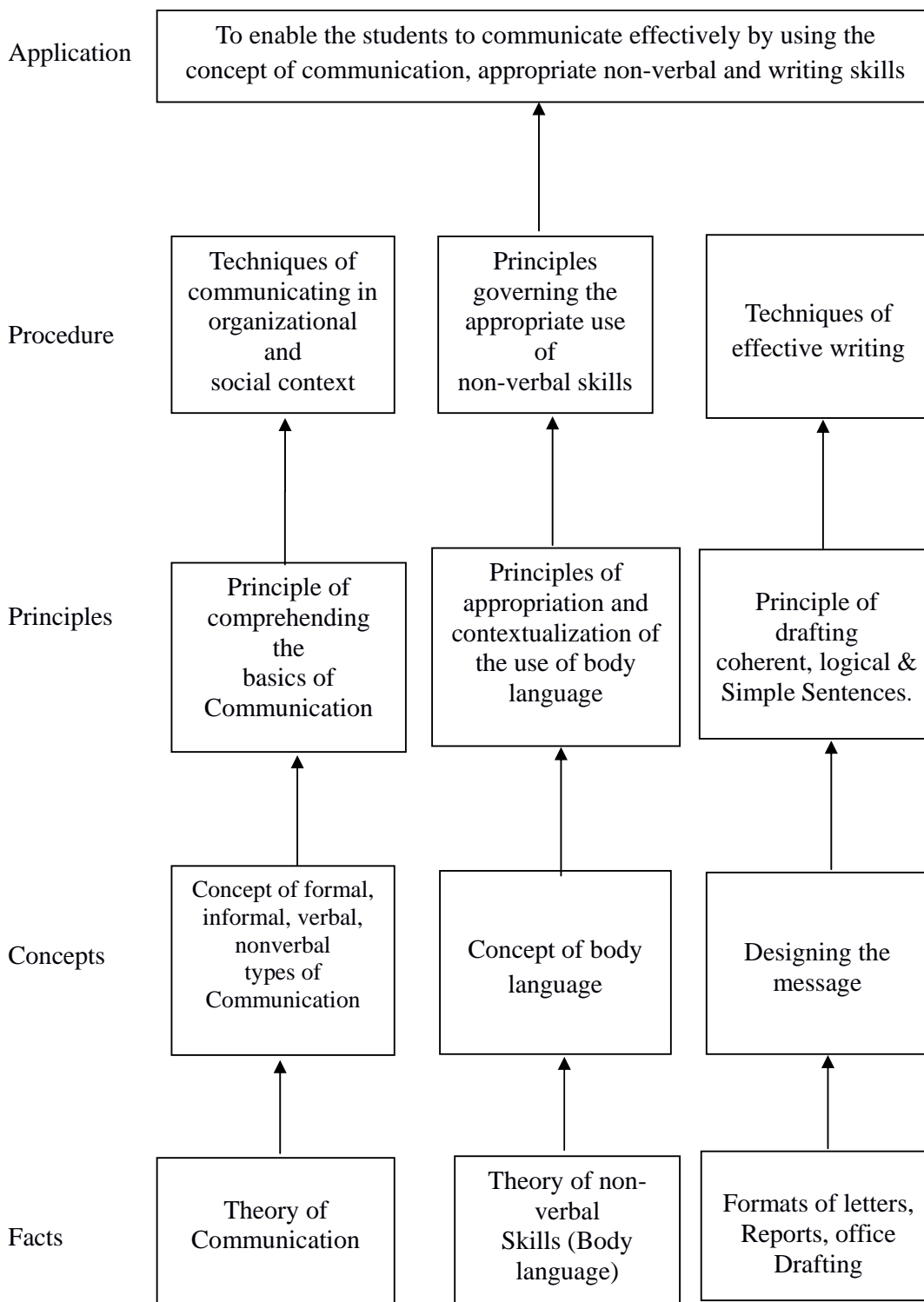
It will guide and direct to develop a good personality and improve communication skills.

General Objectives:

Students will be able to:

1. Utilize the skills necessary to be a competent communicator.
2. Select and apply the appropriate methods of communication in various situations.

Learning Structure:



Theory

Name of the Topic	Hours	Marks
<p>Topic 01 - Introduction to Communication:</p> <p>Specific Objective:</p> <ul style="list-style-type: none"> ➤ Describe the process of communication. <p>Contents:</p> <ul style="list-style-type: none"> • Definition of communication • Process of communication • Types of communication -- Formal, Informal, Verbal, Nonverbal, Vertical, Horizontal, Diagonal 	06	16
<p>Topic 02 - Effective communication</p> <p>Specific Objective:</p> <ul style="list-style-type: none"> ➤ Identify the principles and barriers in the communication process <p>Contents:</p> <ul style="list-style-type: none"> ❖ Principles of communication. ❖ Barriers to communication a. Physical Barrier: <ul style="list-style-type: none"> ❖ Environmental (time, noise, distance & surroundings), ❖ Personal (deafness, stammering, ill-health, spastic, bad handwriting) b. Mechanical : Machine oriented c. Psychological: Day dreaming, prejudice, emotions, blocked mind, generation gap, phobia, status inattentiveness, perception. d. Language : Difference in language, technical jargons, pronunciation & allusions. 	08	20
<p>Topic 03 - Non verbal & Graphical communication:</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Effective use of body language & nonverbal codes ➤ View and interpret graphical information precisely. <p>Contents:</p> <p>3.1 Non- verbal codes: [08 Marks]</p> <ul style="list-style-type: none"> • Proxemics, • Chronemics • Artefacts <p>3.2 Aspects of body language (Kinesics) [10 Marks]</p> <ul style="list-style-type: none"> • Facial expression • Eye contact • Vocalics, paralanguage • Gesture • Posture 	08	28

<ul style="list-style-type: none"> • Dress & appearance • Haptics <p>3.3 Graphical communication [10 Marks]</p> <ul style="list-style-type: none"> • Advantages & disadvantages of graphical communication • Tabulation of data & its depiction in the form of bar graphs & pie charts. 		
<p>Topic 04 - Listening Specific Objective:</p> <p>➤ Effective use of listening</p> <p>Contents:</p> <ul style="list-style-type: none"> • Introduction to listening • Listening versus hearing • Merits of good listening • Types of listening. • Techniques of effective listening. 	02	08
<p>Topic 05 - Formal Written Communication Specific Objectives:</p> <p>➤ Use different formats of formal written skills.</p> <p>Contents:</p> <ul style="list-style-type: none"> • Office Drafting: Notice , memo & e-mail • Job application with resume. • Business correspondence: Enquiry letter, order letter ,complaint letter, adjustment letter. • Report writing: Accident report, fall in production, investigation report. • Describing objects & giving instructions 	08	28
Total	32	100

Skills to be developed in practical:

Intellectual Skills:

1. Analyzing given situation.
2. Expressing thoughts in proper language.

Motor Skills:

1. Presentation Skills focusing on body language.
2. Interpersonal skills of communication

Journal will consist of following assignments:

- 01: Draw the diagram of communication cycle for given situation.
State the type and elements of communication involved in it.
- 02: Graphics:-
- a) Draw suitable bar-graph using the given data.
 - b) Draw suitable pie-chart using the given data.

03: Role play: Teacher should form the group of students based on no. of characters in the situation. Students should develop the conversation and act out their roles.

04: Collect five pictures depicting aspects of body language from different sources such as magazines, newspapers, internet etc. State the type and meaning of the pictures.

NOTE: The following assignments should be performed by using Language Software.

05 Practice conversations with the help of software.

06 Describe people/personalities with the help of software and present in front of your batch.

07 Prepare and present elocution (three minutes) on any one topic with the help of software.

08 Describe any two objects with the help of software.

Learning Resources:

Sr. No.	Author	Title	Publisher
01	MSBTE, Mumbai.	Text book of Communication Skills.	MSBTE, Mumbai.
02	MSBTE, Mumbai.	CD On Communication Skills	MSBTE
03	Joyeeta Bhattacharya	Communication Skills.	Reliable Series
04	Communication Skills	Sanjay Kumar, Pushpa Lata	Oxford University Press

Web Sites for Reference:

Sr. No	Website Address
01	Website: www.mindtools.com/page8.html-99k
02	Website: www.khake.com/page66htm/-72k
03	Website: www.BM Consultant India.Com
04	Website: www.letstak.co.in
05	Website: www.inc.com/guides/growth/23032.html-45k

Course Name : Diploma in Surface Coating Technology
Course Code : SC
Semester : Second
Subject Title : Industrial Chemistry
Subject Code : 19224

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER Hrs.	TH	PR	OR	TW	TOTAL
03	--	03	03	100	25 [#]	--	25 [@]	150

NOTE :

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of test marks for all theory subjects are to be converted as out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

This subject will explain the industrial applications of raw materials used in Surface Coating industry such as thinners and solvents, plasticizers and driers. Besides, another important topic of sewage and industrial waste water treatment, factors responsible for pollution and the importance of environment protection will be dealt with.

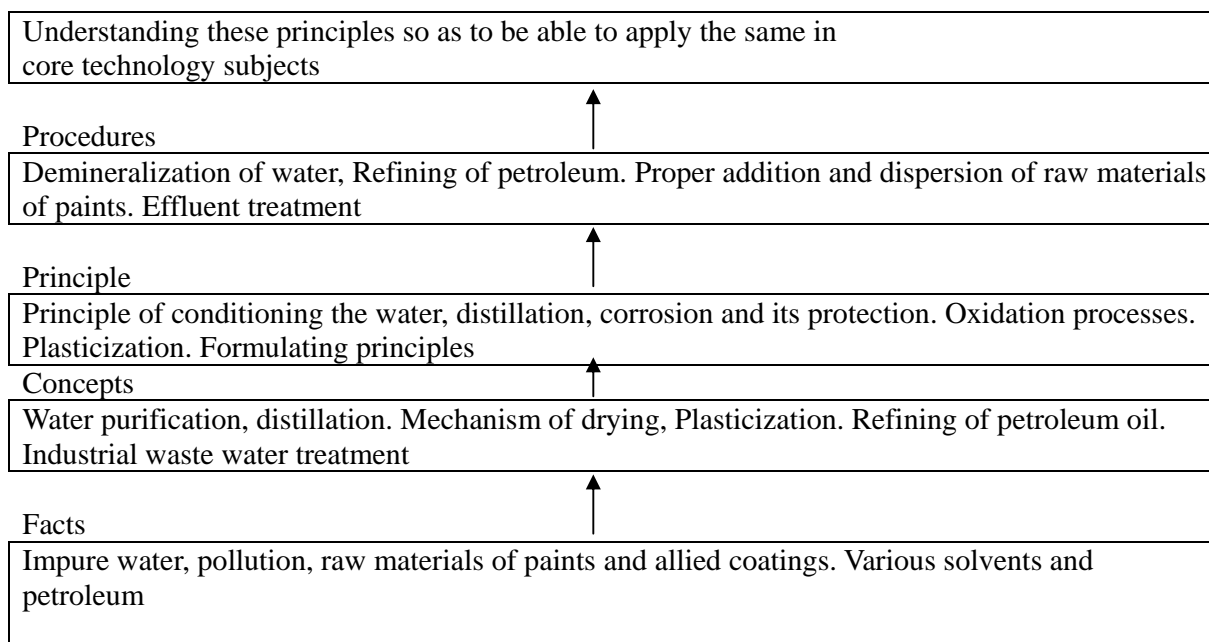
Objectives:

Student will be able to:

1. Understand various fractions of petroleum industry and their applications in paints.
2. Identify users and application of plasticizers and driers in paints.
3. Understand factors responsible for pollution and how to control it.

Learning Structure:

Applications



Contents: Theory

Name of the Topic	Hrs	Marks
<p>Topic 1: Water Technology</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the basic nature, source, properties of water ➤ Describe the effect of conditioning of water ➤ Describe the factors responsible for pollution of water ➤ Explain use of water as solvent <p>Contents</p> <p>1.1 Water Conditioning Marks: 10 Conditioning, purification and softening of water. Methods of conditioning, action – anion exchange resin, demineralization, Distillation process, precipitation methods, phosphate conditioning, silica, iron and oxygen removal, Municipal water purification. conditioning of seawater</p> <p>1.2 Water Pollution & Air Pollution Marks:10 Introduction to Various air pollutants such as dust, carbon, oxygen & nitrogen cycles on planet. Meaning of flora and fauna Various water pollutants. Sewage water & its treatments.</p>	10	20
<p>Topic 2: Solvents</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the basic nature, & source of Solvents ➤ Describe various properties of Solvents ➤ Demonstrate the basic composition and interpret the final behavior of solvent <p>2.1 Hydrocarbons & alcohols: Marks: 10 Introduction & Classification, Properties & uses of Solvents like, Hydrocarbon, Benzene, toluene, Xylene, MTO, naphtha and solvents from coal-tar</p> <p>2.2 Alcohols, Esters & Keto Marks: 10 Properties and uses of solvents like Alcohols, Esters & Ethers, Ketones, Ethers, esters</p>	10	20
<p>Topic 3 : Plasticizers & Driers</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the basic nature, source, properties of Plasticizers & Driers ➤ Describe effect of Plasticizers & Driers in coatings ➤ Explain the steps used in manufacturing Driers <p>3.1 Plasticizers : Marks 10 Classification, Properties and uses of plasticizers, Mechanism of Plasticization - Internal & External Plasticizing effects of Plasticizers in Surface Coating</p> <p>3.2 Driers Marks 10 Types of Driers & their use in Surface Coatings, Methods of preparation of driers, physical & Chemical Properties, mechanism of drying, testing of driers in laboratory.</p>	10	20
<p>Topic 4: Substrates & their behavior towards Coatings</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the basic nature and properties of substrates 	10	20

<ul style="list-style-type: none"> ➤ Demonstrate the final behavior of substrates towards coatings. ➤ Demonstrate various steps used in treatment of substrates <p>4.1 Architectural surfaces Marks 10 Properties of surfaces as Mortar, plasters & rendering-effect of porosity, setting time, water content, extent of drying, composition, etc. on coating behavior. New surfaces like mivan shuttering, gypsum, Plaster of Paris, dry plaster mix and gypsum bond coat.</p> <p>4.2 Industrially oriented surfaces Marks 10 Properties of surfaces, Metallic surfaces steel, aluminum, brass in sheet & cast form, the effect of surface finish & porosity on painting. Nonmetals like rubbers, plastics such as polyethylene, polypropylene, polyester, polycarbonate and nylon</p>		
<p>Topic 5: Water Proofing & Construction Chemicals</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the basic nature, source of leakage in buildings ➤ Demonstrate the basic composition and interpret the need and mechanism of Water Proofing ➤ Describe use of various Water Proofing & Construction Chemicals <p>5.1 Admixtures Marks 10 Definition and Role of admixtures in concrete, Types and classification of various admixtures used. Physical, mineral and chemical admixtures. Role of admixtures as waterproofing agent. Evaluation of admixtures.</p> <p>5.2 Water Marks 10 Need and stages for waterproofing a concrete structure, Method materials and coatings used in water proofing of high rise buildings, Evaluation of permeation, vapor permeability and other physical properties of water proofing coatings.</p>	08	20
Total	48	100

Practical:**Skills:****Intellectual skills**

1. Understand required glass wares.
2. Select different Chemicals.
3. Calculate the Results.

Motor Skills:

1. Clean glass wares, analyze raw materials
2. Weigh raw materials, evaluate properties
3. Operate the equipment for dispersion, evaluate finished products
4. Setting of experimental conditions
5. Handle with safety corrosive and hazardous chemicals

List of Experiments: (minimum 10 experiments to be completed)

1. Determine hardness in sample of hard water
2. Determine the chloride content in the given sample of water
3. Determine the ester value of the given sample of plasticizer
4. Determine density of solvents using hydrometer & Sp. Gravity bottle
5. Determine flash point / fire point of petrol/diesel /solvents
6. Determine the viscosity of solvent using Ostwald's Viscometer
7. Determine metal content in the given sample of driers
8. Determine Acid Value of given sample of plasticizer
9. Determine percentage of CrO₃ in Zinc chromate as per IS : 43
10. Determine percent iron as Fe₂O₃ in red oxide primer
11. Determine pigment percentage in red oxide primer
12. Determine percentage zinc in zinc oxide pigment as per IS : 35
13. Determine water content in plasticizer using Dean & Stark Method.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
1	R N Shreve	Chemical Process Industries	McGraw Hill Book Co.
2	G P A Turner	Introduction to Paint Chemistry	Chapman & Hall
3	H F Perry	Chemical Engineer's Hand Book	McGraw Hill Iner
4	V R Gowarikar & N V Vishwanathan	Polymer Science	New Age International
5	V.S. Ramachandran	Concrete Admixtures Handbook, 2nd Ed. Properties, Science and Technology	Imprint: William Andrew ISBN: 978-0-8155-1373-5
6	Dr. R. P. Rethaliya	Concrete Technology	ISBN 978-93-80358-20-8

7	J.A. & W. Bird	The Waterproofing of Structures	Bird, J. A. & W. & Company
8	Myron Henry Lewis	Modern Methods of Waterproofing Concrete and Other Structures	Norman W. Henley publishing Company

Course Name : Diploma in Surface Coating Technology
Course Code : SC
Semester : Second
Subject Title : Safety in Coating Industry
Subject Code : 19225

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER Hrs.	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

NOTE :

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of test marks for all theory subjects are to be converted as out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

This subject will help the students to comprehend and understand the hazards and difficulties in handling equipment, chemicals & materials during manufacturing activities & application of paints under various circumstances & conditions

General Objectives :

Student will be able to:

1. Understand the significance of reducing Hazards, enhancing productivity & quality life of humans involved in industries.
2. Identify the Hazards associated with raw material, finished products of Coating Industries
3. Understand the safe practices involved for handling the materials & machines.

Learning Structure:

Applications

Understand the problems involved in Manufacturing process & Safety in Coating Industry

Procedures

Handling of materials, equipment, finish products & their storage.

Principle

Principal of grinding & dispersion, mixing, electrostatic, atomization & electrophoresis.

Concepts

All methods of heating, mixing, heat transfer, condensation, compatibility of materials
Polymerization and working under safety as per international standards

Facts

Safety Factory Acts, prospective equipment's Fire extinguishers, Plant layout, controls

Contents: Theory

Topic and Contents	Hrs	Marks
<p>Topic 1: Planning for Safety</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the basic need of safety ➤ Explain the role of office bearers in organizing safety ➤ Explain 5S system & its significance in safety management <p>1.1 Planning Marks: 10 Planning & purpose, definition, nature, Scope & procedure, Health & environment, functions & responsibility.</p> <p>1.2 Organizing safety Marks: 10 Safety committee. Role of management, supervisors and workers. Role of Safety officer. Introduction to 5S Planning</p>	09	20
<p>Topic 2: Introduction to factory act 1948</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe the need of Personal Protective equipment ➤ Explain the classification & selection protective devices ➤ Describe the types of protective devices & application areas <p>2.1 Personal Protective equipment Marks 10 Respiratory & non-respiratory Need for personal protection equipment, selection& uses Respiratory protective devices: classification & selection of Respiratory personal protective devices</p> <p>2.2 Non-Respiratory protective devices Marks 10 Head protection, ear protection, face & eye protection. Hand protection, foot protection, body protection.</p>	09	20
<p>Topic 3: Accident Prevention:</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the causes of accidents ➤ Describe the method of reporting ➤ Describe the safe working practices in Industry <p>3.1 Accidents: Marks 10 Theory, mode of accident occurrence & method of reporting of accidents. Theory of Accident prevention.</p> <p>3.2 Machine operation & Safety: Marks 10 Machine operation, guarding, ergonomics of machines & principle of working of machines & tools. Built in safety devises, maintenance & repairs, incidental safety devises</p>	10	20
<p>Topic 4: Fire & Firefighting appliances & Electrical Hazards:</p> <p>Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the types of fires & causes ➤ Demonstrate the different types of fire- fighting equipment & their application areas ➤ Describe the electrical hazards & prevention <p>4.1 Fire Extinguishers: Marks 10 Portable fire Extinguishers, Smoke detectors, Water sprinkler system</p>	10	20

Fire hydrant system 4.2 Electrical Hazards: Safe current & voltage limits, static electricity hazards. Importance of earthings, Handling & Storage of Solvents & other flammable materials	Marks 10		
Topic 5: Industrial Hygiene Hazards identification and Risk assessment: Specific Objectives: ➤ Define the term Industrial Hygiene ➤ Describe Industrial Hygiene Hazards identification ➤ Describe risk assessment due to unsafe conditions			
5.1 Occupational health hazards: Occupational health hazards related to hazardous material used in paint industries (particularly during Spray painting), unsafe conditions & acts, hazards, errors, oversight mistakes etc. Understanding the Material Safety Data Sheet (MSDS of materials)	Marks 12	10	20
5.2 First Aid: Fundamentals of first aid- burns fractures suffocation, toxic ingestions, bleeding, wounds & bandages, artificial respiratory techniques.	Marks 08		
Total		48	100

Practical:**Skills:****Intellectual Skills:**

1. Understand manufacturing aspects in industry
2. Understand consumption of materials and other resources
3. Detect of finishing point in manufacturing

Motor Skills:

1. Handle equipment and auxiliary equipment
2. Handle mixing tanks, cooling towers
3. Plan maintenance schedules for the manufacturing plants

Psychomotor skills:**List of Experiments: (minimum 10 experiments to be completed)**

To Carry out

- 1) Lung function test
- 2) Noise level Measurement with Sound level meter
- 3) Measurement of illumination with Photometer
- 4) Measurement of air flow with Anemometer for industrial ventilation
- 5) Calculation of Humidity with Dry Bulb & Wet Bulb Thermometers
- 6) Identification of light Intensity using lux meter
- 7) Use of personal protection equipments
- 8) Types of fire extinguishers & their use
- 9) Method & techniques of artificial respiration
- 10) Application of bandages & plasters
- 11) Measure particulate content in the air
- 12) Prepare MSDS of hazardous and non hazardous materials and products
- 13) Prepare maintenance chart for different machines
- 14) Determine fire point of flammable solvents.
- 15) Check effect of voltage, earthing on paint application

16) Calculate Body mass Index

Reference Books:

Sr. No.	Author	Title	Publisher
1	K T Kulkarni	Introduction to Industrial Safety	K T Kulkarni, 305, Khidkaleswar Apt, kalyan
2	A M Sarma	Industrial Health & Safety Management	Himalaya Publishing House, Mumbai
3	D M Dhar	Industrial Safety Management	Everest Publishing House, Mumbai
4	Jeremy Stranks	Health & Safety at Work	Vinod Vasishtha, Kogen Page India Pvt. Ltd, Delhi
5	V R Bhide	A B C of First Aid	Compiled by V R Bhide

Course Name : Diploma in Surface Coating Technology
Course Code : SC
Semester : Second
Subject Title : Technology of Resins - II
Subject Code : 19226

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER Hrs.	TH	PR	OR	TW	TOTAL
03	--	03	03	100	--	25 [#]	25@	150

NOTE :

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of test marks for all theory subjects are to be converted as out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

This subject will explain high performance resins such as epoxy, polyurethane, acrylic etc., their chemistry, manufacturing processes and properties. The subject will explain the role of these resins in industrial coatings for their decorative and protective properties.

Objectives:

Student will be able to:

1. Identify types of resins used in industrial coatings.
2. Describe chemistry, manufacturing processes and properties of resins
3. Identify application areas of resins in coatings.

Learning Structure:

Applications

Understanding and getting familiarized with the properties and uses of resins in the manufacture of high performance coatings.



Procedures

Processing of raw materials such as Isocyanates, polyesters, bis-phenol, etc. and controlling process parameters for getting resins of desired quality.



Principle

Selection of raw material, right proportion knowledge of controlling parameters



Concepts

Concepts of polymerization, esterification, condensations and applications of these concepts in the production of high performance resins



Facts

Raw materials such as silicones, vinyls, isocyanates, polyesters etc. Manufacturing equipment such as resin kettles , mixers etc.

Contents: Theory

Topic and Contents	Hours	Marks
<p>Polyamide & fluorocarbon Resins Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define the polyamide resin, describe their properties & uses. ➤ Describe the fluorocarbon resin & their types ➤ Explain the specialty of types of fluorocarbon resins <p>1.1 Polyamide Resins Marks : 10 Chemistry, manufacturing methods, properties and uses</p> <p>1.2 Fluorocarbon Resins (Teflon) Marks : 10 Commercially used material, Types of Fluorocarbon resins available, their properties & application areas</p>	09	20
<p>Polyurethane Resins Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe the raw materials for Polyurethane resins ➤ Explain the reaction mechanism of Isocyanate with different functional group ➤ Explain the properties & application areas of 2 K PU, PU ester & PU adduct <p>2.1 Classification, raw materials, chemistry, Manufacturing methods , properties and uses Marks: 12</p> <p>2.2 Modifications of Polyurethane such as P.U. Ester, P.U. Adduct Marks : 08</p>	09	20
<p>Acrylic Resins Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Define the terms TPA, TSA & state their application areas ➤ Describe the various types of monomers used in preparation of acrylic resin, properties induced by them ➤ Describe the types of polymerization reactions used for preparation of acrylics ➤ Explain the specialty of types of fluorocarbon resins <p>3.1 Raw Materials , their properties and uses Preparation method such as : bulk polymerization, solution polymerization, emulsion polymerization, Marks : 12</p> <p>3.2 Thermoplastic and Thermo-setting acrylics. Reactions involving use of TSA Acrylic resins, Application areas. Marks : 08</p>	10	20
<p>Epoxy Resins Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the raw materials used for preparation of epoxy resin ➤ Sketch the backbone structure of epoxy resin & describe the reaction possibilities through reaction centers ➤ Describe the properties & applications areas of epoxy with various curing agent ➤ Explain the properties & uses of modified epoxies <p>4.1 Raw materials, chemistry, manufacturing method, Curing agents for</p>	10	20

epoxies such as amines, amides, phenols, 4.2 Modified epoxy resins such as esters, amino, isocyanates Applications of epoxy resins	Marks : 12 Marks : 08		
Silicone Resins Specific Objectives: ➤ State the raw materials used for preparation of Silicon resin ➤ Sketch the backbone structure of Silicon resin & describe the reaction possibilities through reaction center ➤ Explain the properties & uses of modified epoxies Raw materials, chemistry, manufacturing methods Modifications, properties and uses. Role of organic radicals in their Preparation,		10	20
	Total	48	100

Practical:**Skills Acquired:****Intellectual Skills**

1. Understand properties of raw materials
2. Select appropriate test methods / instruments
3. Understand correct interpretation of results

Psychomotor Skills:

1. Handle & weigh raw materials
2. Set apparatus and equipments
3. Handle hazardous chemicals

List of Experiments: (Minimum 10 experiments to be completed)

1. Determine the amine value of Polyamines
2. Determine the amine value of Polyamides
3. Determine the percent NCO Content of Polyurethane
4. Test the various properties of Polyurethane resins
5. Determine hydroxyl value of acrylic resins
6. Determine the acid value of Acrylic resins
7. Determine the stability of emulsion against acidic , basic solutions
8. Determine the epoxy equivalent of epoxy resins
9. Determine hydroxyl value of epoxy paint
10. Test the various properties of Epoxy resins
11. Test compatibility of silicone resin with other resins and heat stability
12. Compare the properties of Epoxy and PU Resins
13. Determine pot life of two-pack system, namely epoxy –hardner

Learning Resources:**Books:**

SR. No.	Author	Title	Publisher
1	P. Parsons	Surface Coatings, VOI I	Chapman & Hall
2	Dr. P Oldring & G Hayward	Resins for Surface coatings 1, II,III	Sita Technology, London
3	O C C A	Convertible Coatings , Part III	Chapman & Ha
4	O C C A	Surface coatings, Vol I	Tafe Educational Books
5	F. W. Billmeyer , Jr.	Text book of Polymer Science	John Willey & Sons
6	W. M. Morgan	Outline of Paint Technology	S K Jain for CBS Publishers
7	V. R. Gowarikar	Polymer Science	Newaje International (P) Ltd

Course Name : Diploma in Surface Coating Technology
Course Code : SC
Semester : Second
Subject Title : Technology of Pigment - II
Subject Code : 19227

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER Hrs.	TH	PR	OR	TW	TOTAL
03	--	03	03	100	--	--	25@	125

NOTE :

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of test marks for all theory subjects are to be converted as out of 50 and to be entered in mark sheet under the head Sessional Work (SW).

Rationale:

This subject will give basic knowledge about pigments and their role in paints. This subject will deal only with Colour pigments. The subject will include the names of pigments, processing their properties and uses. The subject will give knowledge about applications & uses of Special types of pigments such as metallic & special effect Pigments

Objectives:

Students will be able to:

1. Describe Coloured pigments
2. Describe general properties of pigments
3. Identify applications of pigments in paints and colour mataching.

Learning Structure:

Applications

Understanding and getting familiarized with the properties of pigments in the manufacture of paints and allied coating materials



Procedures

General methods of pigment manufacture, evaluation and comparison of properties of pigments as per Indian Standard specifications



Principle

Selection of pigments, and the knowledge of properties of Colour pigment.



Concepts

Concept of grinding and dispersing techniques and significance of shade and grey scale



Facts

Pigments as opacifying agent. Different coloured pigments.
Extenders as non opacifying and physicochemical controllers.

Contents: Theory

Topic and Contents	Hrs.	Marks
<p>Topic 1: Yellow Pigments Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the types of yellow pigments used ➤ Classify the yellow pigments as chrome & non chrome ➤ Describe the properties and application areas of pigments <p>1.1 Inorganic Pigments : Properties & uses of Yellow Oxide of Iron Cadmium Colours, Zinc Chromes, Barium Chromates & Lead Chromates Marks 12</p> <p>1.2 Organic Pigments : Benzidine Yellows, Hansa Yellows, Marks 08</p>	10	20
<p>Topic 2: Orange & Red Pigments Marks 20 Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the types of red pigments used ➤ Sketch the structures of Red Pigments ➤ Describe the properties and application areas of pigments <p>2.1 Inorganic Pigments Properties & uses of Red oxide pigments Marks 08</p> <p>2.2 Organic Pigments Toulidine Red, Signal Red, Red Lake C, Lithol Red, Rubine Toner, Permanent Red Quinacridone Red Marks 12</p>	10	20
<p>Topic 3: Blue & Green Pigments Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the types of Blue & green pigments used ➤ Sketch the structures of Blue & green Pigments ➤ Describe the properties and uses of blue & green pigments <p>3.1 Inorganic Pigments Prussian blue, ultramarine blue Properties and uses off Chrome green, Chrome oxide green Marks 12</p> <p>3.2 Organic Pigments Properties and uses of phthalocyanine blue, phthalocyanine green, Marks 08</p>	10	20
<p>Topic 4: Decorative pigments Specific Objectives:</p> <ul style="list-style-type: none"> ➤ State the significance of Decorative Pigments ➤ Describe the mechanism of special effect coming from decorative Pigments ➤ Describe the properties and application areas of these pigments <p>4.1 Special effect pigments: Introduction to fluorescence, phosphorescence and pearlescence. Fluorescent, phosphorescent and pearlescence pigment. Marks 12</p> <p>4.2 Metallic Pigments: Properties and uses of metallic pigments such as aluminum and copper pigments. Marks 08</p>	10	20
<p>Topic 5: Dyes and Toners Specific Objectives:</p> <ul style="list-style-type: none"> ➤ Describe the difference between dyes & toner ➤ Describe the properties of Dyes & toners ➤ Describe the application areas of Dyes & toners <p>5.1 Basic introduction to dyes and toner pigments. properties and uses of PMA and PTMA toners (pink, violet and blue) Marks 10</p>	08	20

5.2 Basic concept of colour: additive and subtractive colours mixing, complimentary colours, colour perception and colour blindness. Marks 10		
Total	48	100

Practical:**Skills to be developed****Intellectual Skills:**

1. Understand color and matching shade with color pigments.
2. Identify glass-wares and raw materials.
3. Calculate Oil absorption of color Pigments.
4. Analyse the test result for use of pigments in particular area.

Motor Skills :

1. Weigh & handle Chemicals.
2. Preparing pigments by addish raw materials.
3. Compare properties by taking draw down.
4. Prepare panel as per specification to carry out Chemical resistance test of pigments.

List of practical experiments: (minimum 10 experiments to be completed)

1. Determine color, particle size, particle shape and texture of color pigments
2. Determine Undertone & Mass tone of color pigments by taking draw down
3. Determine Oil absorption value of colour pigments
4. Determine bulk density of color pigments
5. Determine Specific gravity of color pigments
6. Determine Resistance to acid/alkali of Pigments and pH of water extract
7. Determine resistance to heat of pigments
8. Determine tinting strength of color pigments
9. Test bleeding tendency of color pigments in various solvents
10. Prepare home green pigment in laboratory
11. Prepare middle chrome pigment in laboratory
12. Prepare a sample of paint from colour pigment & compare for shade matching
13. Conduct Shade Matching-Blue & Green
14. Conduct Shade Matching- Yellow & Red
15. Conduct Shade Matching-Violet & Grey

Learning Resources:**Books:**

Sr. No	Author	Title	Publisher
1	T C Patton	Pigment Hand Book, Vol I & II	John Wiley & Sons
2	W M Morgan	Outlines of Paint Technology	Charles Griffin & CO. Ltd
3	Gunter Buxbaun	Industrial Inorganic Pigments	VCH Wiley Publishers
4	W Herbst & K Hunger	Industrial Organic Pigments	VCH Wiley Publishers
5	Swaraj Paul	Surface Coatings	John Wiley & Sons
6	V C Malshe & Minal Sikchi	Basic Paint Technology PART-I	--

Course Name : All Branches of Diploma in Engineering and Technology

**Course Code : AE/CE/CH/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/
ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI/DC/TC/TX/AA/SC/PN/PC/
ML/FC**

Semester : Second

Subject Title : Development of Life Skills

Subject Code : 17010

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	--	02	--	--	--	25@	--	25

Rationale:

Globalization has emphasized the need for overall development of technician to survive in modern era. Soft skills development in addition to technical knowledge; plays a key role in enhancing his/her employability.

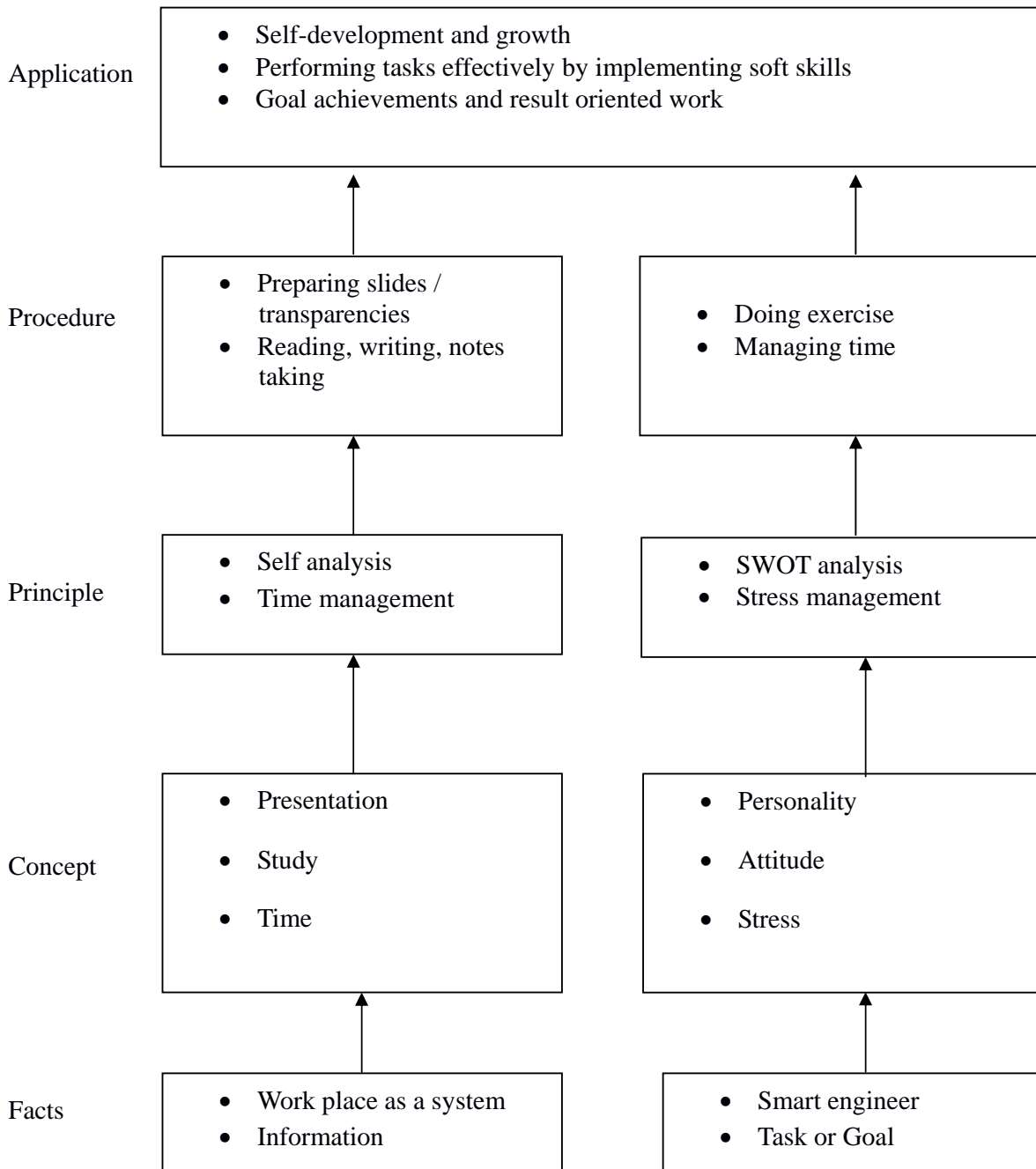
This subject aims to provide insights into various facets of developing ones personality in terms of capabilities, strengths, weakness, etc as well as to improve reading, listening and presentation skills. Also in this age fierce competition, the time and stress management techniques will immensely help the technician to live happy and purposeful life.

General Objectives:

After studying this subject, the students will be able to:

1. Understand and appreciate importance of life skills.
2. Use self-analysis and apply techniques to develop personality.
3. Use different search techniques for gathering information and working effectively.
4. Improve the presentation skills.

Learning Structure:



Contents: Theory

Topic and Contents	Hours
<p>TOPIC 1: SELF ANALYSIS Specific Objectives: ➤ To introduce oneself.</p> <p>Contents: 1.1 Need of Self Analysis 1.2 Attitude and types (positive, negative, optimistic and pessimistic) Guidelines for developing positive attitude.</p>	02
<p>TOPIC 2: STUDY TECHNIQUES Specific Objectives: ➤ To identify different process and strategies. ➤ To improve reading, listening and notes taking skills.</p> <p>Contents: 2.1 Learning strategies 2.2 Learning process 2.3 Organization of knowledge 2.4 Reading skills 2.5 Listening skills 2.6 Notes taking 2.7 Enhancing memory</p>	03
<p>TOPIC 3: INFORMATION SEARCH Specific Objectives: ➤ To search information as per the need.</p> <p>Contents: 3.1 Sources of information 3.2 Techniques of information search (library, internet, etc)</p>	02
<p>TOPIC 4: SELF DEVELOPMENT Specific Objectives: ➤ To set primary goals using SMART parameters. ➤ To Priorities the work effectively. ➤ To cope up with stress effectively.</p> <p>Contents: 4.1 Goal setting and its importance. 4.2 Characteristics of Goal setting (SMART- Specific, Measurable, Attainable, Realistic, Time bound) 4.3 Time Management - Importance, prioritization of work, time matrix, time savers, and time wasters. 4.4 Stress Management - Definition, types of stress, causes of stress, managing stress, and stress busters.</p>	05
<p>TOPIC 5: PRESENTATION TECHNIQUES Specific Objectives: ➤ To plan for presentation. ➤ To prepare contents for presentation.</p> <p>Contents: 5.1 Importance of presentation. 5.2 Components of effective presentation (Body language, voice culture , rehearsal, etc) 5.3 Preparing for presentation. 5.4 Use of audio/video aids. (audio, video, transparency's, PowerPoint presentations, etc)</p>	02

5.5 Performing presentation (Seminars, paper presentations, compering, etc)	
TOPIC 6: GROUP DISCUSSION Specific Objectives ➤ To understand the concept of group discussion ➤ To know the purpose of group discussion Contents 6.1 Group discussion concept and purpose 6.2 Method of conduction	02
Total	16

Practical:**Skills to be developed:****Intellectual Skills:****Student will be able to**

- Develop ability to find his capabilities.
- Select proper source of information.
- Follow the technique of time and stress management.
- Set the goal.

Motor Skills:**Student will be able to**

- Follow the presentation of body language.
- Work on internet and search for information.
- Prepare slides / transparencies for presentation.

List of Practicals/activities:

1. Giving self introduction. Observe the demonstration of self introduction given by the teacher and prepare a write up on the following points and introduce yourself in front of your batch in 5 minutes
 - Name
 - Native place
 - Background of school from where he / she passed
 - Family background
 - Hobbies / salient achievements / idols if any for self development
 - Aims of life as an Engineer
2. Provide responses to the questions based on the moral story given in the assignment.
3. Judge your attitude by responding to the tests given in the assignment and write comments on your score.
4. Read any chapter from the subject of Engineering Physics / Engineering Chemistry and identify facts, concepts, principles, procedures, and application from that chapter
5. Participate in the panel discussion on techniques of effective learning and provide the responses to the questions.

6. Access the book on Biography of Scientists/Industrialist/Social leader/Sports Person from library. Read the book and note the name of author, publication, year of publication, and summarize the highlights of the book.
7. Prepare notes on given topic by referring to books / journals / websites.
8. Prepare 8 to 10 power point slides based on the notes prepared on the above topic. Present the contents for 10 minutes Group wise(Group will be of 4 students)

Note - Subject teacher shall guide the students in completing the assignments based on above practical.

Learning Resources:

Books:

Sr. No.	Author	Name of Book	Publication
1	Richard Hale and Peter Whitlam	Target setting and goal achievement	Kogan Page
2	Andrew Bradbury	Successful Presentation Skills	The Sunday Times - Kogan
3	Ros Jay and Antony Jay	Effective Presentation	Pearson - Prentice Hall
4	Subject Experts - MSBTE	Handbook on Development of Life Skills	MSBTE
5	Nitin Bhatnagar and Mamta Bhatnagar	Effective Communication and Soft Skills	Pearson
6	D. Sudha Rani	Business Communication and Soft Skills	Pearson
7	Barak K Mitra	Personality Development and Soft Skills	Oxford University Press
8	Dr. T. Kalayani Chakravarti and Dr. Latha Chakravarti	Soft Skills for Managers	biztantra