

Course Name : Diploma in Technical Chemistry
Course Code : DTC
Semester : Second
Subject Title : Mathematics-II
Subject Code : 135MA21

Teaching & Examination Schemes

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	2	-	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale:

The study of mathematics is necessary to develop in the student, the skills essential for studying technical subjects. The subject is an extension of basic mathematics of first semester which is a prerequisite for technical studies.

Objective:

1. To lay a strong foundation in study of calculus which is the backbone for study in technology..
2. To make students well versed in the prerequisites for further studies in mathematics and technology.
3. To impart knowledge of statistics.

Sr. No.	Contents	L	M
	Section- I		
1	. Derivatives : 1.1 Derivatives of standard functions by first principle. 1.2 Rules of differentiation. 1.3 Derivative of composite function. (chain rule). 1.4 Derivative of implicit function, parametric function. 1.5 Logarithmic differentiation 1.6 Second ordered derivative.	16	30
2	Applications of derivatives : 2.1 Equation of tangent and normal to the given curve. 2.2 Rate problems.	08	10

	Section- II		
3	Integration 3.1 Definition of integration. Integration of standard functions. 3.2 Theorems of integration. 3.3 Methods of Integration 4.3.1 Integration of rational functions. 4.3.2 Integration by partial fractions. 4.3.3 Integration by parts. 3.4 Definite Integration Definition of definite integral with simple problems	16	30
4	Statistics Mean, weighted mean of raw data . Mean, Standard Deviation, Variance, Coefficient of Variation of classified data	08	10
	Total	48	80

REFERENCE BOOKS:

- 1) Basic Mathematics – II by B.M.Patel, J.M.Rawal and others - Nirali Prakashan, 6th edition -Jan 2010
- 2) Mathematics for Polytechnic - S. P. Deshpande- Pune Vidyarthi Griha Prakashan, Revised edition – Aug.2010

Course Name : Diploma in Technical Chemistry.

Course Code : DTC

Semester : Second

Subject Title : Physics-II

Subject Code : 135PH22

Teaching & Examination Scheme :

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	3	80	32	20	100	40	25	10	-	-	25	10	150

Rationale:-

Physics is the foundation of any engineering discipline. Its principles, laws, rules, results and conclusions drawn from observations and predictions of various phenomena occurring in nature; play important role in solving field problems in engineering and technology.

Though the span of physics is from quark to galaxy or particle physics to astrophysics; here certain topics are carefully selected for particular discipline. These topics will provide sufficient fundamental as well as background knowledge for the particular branch. Proper attention is given to the selection of sub-topics and their depth so that student will be able to cope up with innovations and new technologies in his field.

Objectives:-

The student should be able to :

- understand the linear and non-linear motion of bodies
- understand the fundamentals of waves and its propagation in different mediums.
- understand the fundamentals of electric charges and its motion in different conductors.
- analyze different materials based on their crystal structures and select the proper material for specific purposes

Syllabus

Part – I Theory

No.	Contents	L	M
	SECTION - I		

1	<p>1. Kinematics</p> <p>1.1 Linear motion Equations of motion, distance traversed by object in nth second, velocity-time diagrams, uniform acceleration and retardation, equations for motion under gravity, problems</p> <p>1.2 circular motion Angular displacement, angular velocity, angular acceleration, relation between angular velocity and linear velocity, equations of circular motion, angular distance traversed by object in nth second, S.H.M., uniform circular motion as S.H.M., equation for displacement, velocity and acceleration in SHM, problems, graphical representation of displacement, velocity and acceleration of particle performing SHM, starting from mean, position and extreme position.</p>	10	15
2	<p>2. Kinetics</p> <p>2.1 Newton's laws of motion Momentum, impulse, impulsive force, Newton's laws of motion with equations and their applications, problems, pulleys, motion of lift.</p> <p>2.2 Work, power and energy Definitions of work, power and energy, equations for potential energy and kinetic energy, work energy principle, representation of work by graph, torque, work done by torque, problems.</p>	10	15
3	<p>Crystal Structure</p> <p>Lattice, Bravais lattice, unit cell, cubic crystal structures(SC, BCC, FCC), coordination number, packing efficiency, relation between radius of atoms and unit cell length, Miller Indices, Miller planes and directions</p>	5	10
SECTION - II			
4	<p>4. Current Electricity</p> <p>Ohm's law, resistance, conductance, resistivity, conductivity, series and parallel combination of resistors, problems, Wheatstone's bridge, meter bridge, potentiometer, comparison of emf of cells, internal resistance of cell, heating effect of electric current.</p>	10	20
5	<p>5. Sound</p> <p>Transverse and longitudinal waves, velocity of sound, Newton's formula, Laplace's correction, effect of temperature, pressure, humidity on velocity of sound, concept of resonance, resonance tube (closed at one end), experimental determination of velocity of sound by resonance tube, transverse vibration of strings, laws of vibrating strings, sonometer,</p>	13	20
Total		48	80

Part II- Practicals

List of experiments (10 experiments should be performed)

1. Determination of 'g' by Simple pendulum.
2. Verification of Ohms Law.
3. To verify series and parallel law using meter bridge.
4. To verify first law of vibrating strings using sonometer.
5. To determine resistance of galvanometer using meter bridge.
6. To determine velocity of sound using Resonance Tube.
7. To compare the emf of two given cells using Potentiometer.
8. To determine Internal resistance of the cell using Potentiometer
- 9 To study different cubic crystal structures.
- 10 To study miller indices of planes and directions.

Learning Resources-

Text Book: -

Engineering Physics by Gaur R. K. and Gupta S. L., Dhanpat Rai Publications, New Delhi, Eighth Edition, 2001., Physics text book of 11th & 12th std.(NCERT)

References:-

1. Fundamentals of Physics Extended, By Halliday D., Resnik R. and Walker, Wiley – India, New Delhi, Eighth Edition, 2008.
2. Physics for scientists and Engineers by Serway R. A. and Jewett, Jr. J. W., Thomson Learning (Indian reprint), New Delhi, Sixth Edition, 2007.

Course Name : Diploma in Technical Chemistry
Course Code : DTC
Semester : Second
Subject Title : Applied Chemistry
Subject Code : 135CH23

Teaching and Examination Scheme:-

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	2	3	80	32	20	100	40	25	10	-	-	25	10	150

Rationale:-

This syllabus of chemistry is under the category of applied science. It is intended to teach students the quality of water & its treatment as per the requirement, & selection of various construction materials & their protection by metallic & organic coatings. The topics covered will provide sufficient fundamental as well as background knowledge for the particular branch. Proper attention is given to the selection of sub-topics and their depth so that student will be able to cope up with innovations and new technologies in his field.

Objectives:-

1. Implementing the knowledge for the utilization of water resources in engineering & troubleshooting of the problems while using unsuitable water.
2. Able to select appropriate materials used in construction, lubrication, nanotechnology etc.
3. Apply knowledge to enhance operative life span of engineering material & structure by various protective methods.

Syllabus

Part – II : Theory

SECTION - I				
No.	Chapter	Contents	No. of Hours	Marks
1	Alloys	Definition, purpose of alloy, Preparation methods, types: Ferrous & Non Ferrous alloy, Ferrous alloy: Steel, Alloy steel, Composition, Properties and uses, Non Ferrous alloy: Alloy of Cu, Zn, Al, Sn, Pb Composition, Properties and uses.	06	10
2	Water	Introduction, Hard and soft water, hardness and its determination (EDTA	08	15

		method only). boiler problems-scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention, Water softening processes – Lime – Soda process, Zeolite Permutit method, Ion exchange method and comparison of methods, Numerical problems on hardness by EDTA method.		
3	Lubricants	Lubricant, Lubrication, Function of lubricant, Types of lubricants, Mechanisms of lubrication, Ideal lubricant and properties: Viscosity, Viscosity index, fire point, flash point, pour point, cloud point, Saponification value, Acid value.	08	15
SECTION – II				
4	Corrosion	Introduction, Types of corrosion, Atmospheric corrosion, types and mechanism of Atmospheric corrosion, oxide films factors affecting the corrosion, electrochemical corrosion, mechanism of electrochemical corrosion, types of corrosion galvanic and concentration cell corrosion, protective measures against corrosion: coatings (galvanic and zinc, organic coating agents, Electroplating, metal cladding,).	08	15
5	Polymers	Polymer, Monomer, Polymerisation, Addition and condensation polymerisation, Plastics: definition, types: thermosetting & thermo softening plastics, compounding of plastics, properties and applications of plastics, Rubber, structure of rubber, Natural rubber: preparation & properties, Vulcanization of rubber, properties of vulcanized rubber, synthetic rubber & its comparison with natural rubber. Properties and applications of rubbers.	08	10
6	Fuels	Classification, characteristics combustion and chemical principles involved in it, calorific value: gross and net calorific values. Solid Fuels: Types, selection of coal, Proximate and ultimate analysis of coal Liquid Fuels: Petroleum: its chemical composition and fractional distillation, cracking of heavy oil residues – thermal and catalytic	10	15

		cracking, Gaseous Fuels: Composition and properties of Natural, coal gas, LPG		
			48	80

List of experiments Part II:- Practicals

1. To estimate the amount of iron in plain carbon steel alloy.
2. To estimate the amount of copper in Brass alloy.
3. To estimate the amount of zinc in Brass alloy.
4. To estimate of hardness of water by EDTA complexometric titration.
5. To estimate estimate amount of chloride in tap water by Mohr's Method
6. To determine saponification value of given oil.
7. To determine acid value of given lubricating oil.
8. To determine relative viscosity of given oil.
9. To determine flash point value of given lubricating oil using Able's apparatus.
10. To determine flash point value of given lubricating oil using Pensky Martin's apparatus.

Learning Resources:

Text Book :-

1. A Text Book of Chemistry Shashi Chawla Educational & Technical Publishers Dhanpat Rai & Co. (Pvt.) Ltd, Edition: Third (2005)
2. Engineering Chemistry Jain & Jain Dhanpat Rai & Co. (Pvt.) Delhi-110 006Ltd Edition: Fifteenth (2008)

Reference Books:-

Nanotechnology: Principles & Practices Shubha K. Kulkarni
Capital Publishing House, Daryangaj, 2006. New Delhi - 110002 (INDIA)

Course Name: Diploma in Technical Chemistry

Course Code : DTC

Semester : Second

Subject Title : Communication Skills- II

Subject Code : 135HM24q

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	Pr		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	2	-	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale:

The main objective of this subject is to enable students to develop effective communication skills. The basic concepts of oral, written and nonverbal communication will train them to become efficient and effective speakers. The study of Body Language will enable them to comprehend the effective use of gestures and posture. The students have been exposed to the Language Skills pertaining to English and principles of written communication will enhance their confidence and make them well versed in technical writing skills. In order to give students a proper exposure to good writing, a text book containing selected passages is introduced. Some inspirational stories and quotes will widen their horizons of knowledge and will also guide them to use these quotes in appropriate context.

Effective communication skills through enhanced language learning can motivate students to prosper in different spheres of life. The innovative learning strategies will enable students to improve their pronunciation, diction and become confident speakers. The listening skills will help them to comprehend the content and enhance their analytical skills. The development of speaking skills will improve their power of expression and instill assertiveness and confidence within them. Students will also become proficient in their conversational skills by learning correct usage of words and developing neutral accent. This will prepare them for larger responsibilities in their professional field where communication is a part and parcel of life. Eloquent speech, effective presentation and perfect articulation of ideas can leave a lasting impression and make one successful in personal and professional life.

Objectives:

1. To facilitate learner friendly atmosphere and train students to eliminate stage fear and fear of foreign language through active participation in activities
2. To train students to focus, absorb, comprehend and reproduce the key concepts

3. To acquire neutral accent and communicate fluently and confidently without the influence of mother tongue.
4. To understand and use the basic concepts of communication and speak and write effectively.
5. Instill self-confidence and presence of mind through impromptu activities.
6. Drafting effective letters in the proper format.
7. Develop scientific curiosity in students through topics like scientific queries and the universe and to develop in them scientific bent of mind.

LEARNING STRUCTURE

Application:

Enabling students to become eloquent speakers and efficient listeners through enhanced communication learning . Using appropriate oral, written and non-verbal skills.

Procedure:

1. Technique of providing responses to short and long questions
2. Principles governing the appropriate use of non verbal and oral skills
3. Technique of effective listening , speaking and comprehension .

Principles:

1. Principles of comprehending the basic of communication
2. Principles of appropriation and contextualization of the use of body language
3. Principles of drafting coherent, logical and simple sentences

Concepts:

1. Concept of spoken, written and non-verbal types of communication
2. Concept of Body Language and spoken communication through presentations
3. Formats of letters, reports and technical descriptions.

Facts:

1. Theory of communication skills
2. Theory of Body Language
3. Formats of letters: official letters pertaining to day- to -day situations and campus related situations.

CONTENT: Theory

Section I

Name of Topic	Lectures	Marks
Communication Skills-II (TEXT) compiled by Mrs. R. Thomas (4 or 5 chapters giving exposure to good English and 4 or 5 topics related to communication-process , types , body language and barriers) <ul style="list-style-type: none">• Testing grasp of the matter and expression in 2 or 3 sentences <ol style="list-style-type: none">1.1. Definition, Communication Cycle/process1.2. The elements of communication:1.3. Definition of communication process1.4. Stages in the process: defining the context, knowing the audience, designing the messages, encoding, selecting proper channels, transmitting, receiving, decoding and feedback1.5. Introduction to effective oral communication1.6. .Communication Barriers and how to overcome them, knowing the audience, structuring the messages, selecting proper channels, minimizing barriers and facilitating feedback <ol style="list-style-type: none">2.1 Success stories to motivate students and character building to inculcate work ethics and values <ul style="list-style-type: none">• Descriptive answers to test the grasp of the matter and ability to express• composition	48	15
		15
		10
Total		40

Section II

SR.NO	TOPIC	Marks	
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1	<p style="text-align: center;">Reporting skills</p> <ul style="list-style-type: none"> • Converting a conversation into a narration • Correcting grammatical errors in the given passage • Active and passive voice 	15	
2	<p style="text-align: center;">Narration and Summarization</p> <ul style="list-style-type: none"> • Explaining proverbs in one's own words • Preparing a précis 	10	
2.	<p style="text-align: center;">Technical Writing</p> <ul style="list-style-type: none"> • Description of objects • Description of process 	15	
	Total	40	
	TOTAL	80	

Enhanced Language Learning Through language laboratory

CONCEPT:

1. Concept of oral skills
2. Concept of listening skills

SR.NO	TOPIC		
1	<p style="text-align: center;">LISTENING SKILLS</p> <ul style="list-style-type: none"> • Introduction to listening skills, listening to recorded text, speeches of famous Indian orators and answering questions • Listening to conversations and panel discussions and encouraging students' comments . • Introduction to phonetics ; listening to the correct articulation of words • Recording and listening to one's own voice 		
2	<p style="text-align: center;">SPEAKING SKILLS</p> <ul style="list-style-type: none"> • Extempore • Role play and video recording • Mock interviews • JEST a minute • Technical quiz (to update knowledge in their respective discipline) • Correction of commonly mispronounced words • Conversation through role play to un*- 		

	<ul style="list-style-type: none"> • derstand barriers • Explaining proverbs orally in one’s own words • .Power point presentation on technical topics 		
3	<p style="text-align: center;">READING SKILLS</p> <ul style="list-style-type: none"> • Techniques of reading – silent reading and reading aloud • Summarization –oral summary <p style="text-align: center;">Reading Passages</p> <ul style="list-style-type: none"> • Pause • Diction • Enunciation • Voice modulation • Accent • pitch 		

Term work : testing student’s receptive and reading skills

Assignments:

1. Listening comprehension (2hours)
2. Conversation sessions-enacting from newspaper report (4hrs)
3. Barriers that hinder a particular communication situation(1 hr)
4. Developing a story based on a proverb/ spin a yarn-(2hrs)
5. Speech sessions(3 hrs)
6. Description of objects and process (4 hrs)
7. Reading sessions –(2 hrs)
8. Conversational Skills: Role Plays (6 hrs)
Students are going to perform the role on any 6 situations, given by the teacher.
9. Dialogue writing for the given situations. (2 hrs-2 assignments)
10. Newspaper Report Writing (6 hrs- 2 assignments)
Write any two events from the newspaper as it is.
Write any two events on the given situations by the teacher.

Skills to be developed:

Intellectual Skills:

1. Skills of Speaking in correct English
2. Compiling information and summarizing

3. Understanding the barriers in communication

Motor Skills:

1. Use of appropriate body language
2. Use of appropriate medium for communication
3. Assessing audience

Listening Skills:

1. Skills of listening and Comprehension

Learning Resources:

Text Book: Communication Skills II-
Compiled by Mrs. Thomas , H&M Dept

Reference Books: Books for reference:

1. Communication Skills for Engineers, Sunita Mishra and Muralikrishna , Pearson, New Delhi, First edition, 2006
 2. Technical Communication, Raman Meenakshi, OUP, India, Second impression, 2004
 3. Cliffs TOEFL, Pyle Michael, BPB publications, First edition, 1992
 4. Developing Communication Skills, Mohan Krushan, Banerji Meera, Macmillan, India, First Edition, 2000
 5. Communication Skills, Bhattacharya Joyeeta, Reliable Skills, Mumbai, First Edition, 2003
 6. Eveyones Guide to Effective Writing, JAYakaran, Apple Publishing, First edition, 2001.
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Course Name : Diploma in Technical Chemistry
Course Code : DTC
Semester : Second
Subject Title : Chemistry of Aromatic Compounds
Subject Code : 135CH25

Teaching and Examination Scheme:-

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	3	3	80	32	20	100	40	25	10	-	-	25	10	150

Rationale:

Organic chemistry is one of the subjects that provide the basic knowledge of the organic compounds, which are used in the all types of processes in chemical processing of the textiles. The chemical technologist should possess this knowledge to anticipate the effects of the chemicals used during the processing not only to control the process but also to avoid the rework in the process. Synthetic dyes are based on organic chemistry and are used in the chemical processing very widely. This subject is intended to impart necessary knowledge in this area.

Objectives:

The students will be able to:

1. Understand the fundamentals of dyestuffs.
2. Understand the fundamentals of auxiliaries.
3. Conceive thorough ideas regarding the role of organic chemicals in textile wet processing.
4. Understand the use of organic chemicals in laboratories.

Syllabus

Part –I Theory

S.N.	Contents	Hours Reqd.	Marks Allotted
Section I			

1.	Aromaticity & Sources of aromatic hydrocarbons	05	05
2.	Reactions of Benzene Addition reactions Hydrogenation,halogenations, Substitution reactions, Chemistry of intermediates manufacturing, process such as sulphonation, nitration, halogenation, hydroxylation, carboxylation, alkali fusion, diazotization, stabilization of diazonium salts.	12	15
3.	Phenols, naphthols.	04	10
4.	Aromatic aldehydes, ketones.	04	10
Section-II			
5.	Aromatic amines.	05	10
6.	Aromatic carboxylic acids.	04	10
7.	Poly-nuclear hydrocarbons.	04	05
8.	Introduction to Spectroscopy IR, NMR, Mass spectra.	10	15
	TOTAL	48	80

Part II:- Practicals

Practicals:

1. Qualitative analysis of organic compounds (single component) with more emphasize on:
Purification of organic compounds (Recrystallisation, sublimation, reprecipitation & distillation),
Melting point & Boiling point determination, Preparation of derivatives.
2. Quatitative analysis of organic compounds (Volumetric).

Learning Resources:

Text Book :-

1. A Text Book Of Organic Chemistry By Arun Bahl, B S Bahl, S Chand & Company Pvt Ltd. New Delhi, 15Th Edition 2000
2. TY BSc Chemistry Practical Booklet.

Reference Books :-

1. Organic Chemistry Vol -I – L. Finar sixth edition
2. Chemistry of dyestuff and Principles of dyeing - V.A.Shenai Sevak Publications
Mumbai
400031 Ed-Fourth 2000

Course Name : Diploma in Technical Chemistry
Course Code : DTC
Semester : Second
Subject Title : Student Centered Activity/Test

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		PR		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Rationale:–

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Expert lectures, E-learning sources, E-library, Internet, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

The Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Take the advantages of E-learning sources

