Veermata Jijabai Technological Institute (V.J.T.I)

(Central Technological Institute, Maharashtra State, INDIA)

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Programme: Diploma in CHEMICAL ENGINEERING (DCHE) **Semester: I** **Implemented from: 2017**

COURSE CODE	COURSE	GR	TEACHING SCHEME (HRS/WK)				EXAMINATION SCHEME												
			L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
								Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
175MA11a	MATHEMATICS I	B	3	2	-	5	3	80	32	20	100	40	-	-	-	-	25	10	125
175PHI2	PHYSICS I	B	3		2	5	3	80	32	20	100	40	25	10	-	-	25	10	150
175CH13	BASIC CHEMISTRY	B	3	-	2	5	3	80	32	20	100	40	25	10	-	-	25	10	150
175HM14x	COMMUNICATION SKILLS	B	3	2	-	5	3	80	32	20	100	40	-	-	-	-	25	10	125
175CH15	CHEMISTRY OF ALIPHATIC COMPOUNDS	B	3	-	3	6	3	80	32	20	100	40	25	10	-	-	25	10	150
175ME16	ENGINEERING GRAPHICS I	C	2	-	4	6	-	-	-	-	-	-	50	20	-	-	50	20	100
	TOTAL		17	4	11	32		400	-	100	500	-	125	-	-	-	175	-	800

Abbreviations: B – Basic; C – Core; A – Applied; M – Management; L – Theory Lecture; T – Tutorial; P – Practical; TH – Theory Paper; IST – In-Semester Test; PR – Practical Exam; OR – Oral Exam; TW- Term Work.

Curriculum Coordinator	Head	Dean - Diploma
	Diploma in CHEMICAL ENGINEERING (DCHE)	

T & A Chemistry Department

DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: FIRST
COURSE TITLE	: MATHEMATICS I
COURSE CODE	: 175MA11a

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	5	3	80	32	20	100	40	-	-	-	-	25	10	125

Course Objectives:

1. To teach students basic facts, concepts and principles of Mathematics as a tool to analyze engineering problems.
2. To make students well versed in the prerequisites for further studies in Mathematics and Engineering

Course Outcomes:

Student should be able to

CO1	Apply properties of determinants and matrices to solve simultaneous linear equations.
CO2	Use binomial theorem for expansion and find equation of straight line, under given conditions.
CO3	Use properties and elementary operations of complex numbers to solve the problems.
CO4	Apply basic concepts in trigonometry to solve engineering problems.

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		Determinants:	6	12	1	40%	40%	20%
	1.1	Determinant of order three.						
	1.2	Cramer's rule.						
	1.3	Properties of determinants						
2		Binomial Theorem	8	8	2	40%	40%	20%
	2.1	Concepts of Permutations and Combinations and problems based on ${}^{n}P_{r}$, ${}^{n}C_{r}$						
	2.2	Binomial Theorem with positive integral						

		index, general term, Binomial expansion for negative integral and fractional index. .						
3		Straight line	5	8	2	40%	40%	20%
	3.1	Equations of straight lines in different forms.						
	3.2	Angle between two straight lines, conditions for two parallel and perpendicular straight lines.						
4		Complex Numbers	6	12	3	40%	40%	20%
	4.1	Definition of complex number, Elementary operations.						
	4.2	Argand's Diagram, Modulus, Amplitude, Polar form of a complex number.						
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**						
5		Trigonometry	16	28	4	40%	40%	20%
	5.1	Circular measure of an angle, Conversion from degrees to radians and radians to degrees.						
	5.2	Trigonometric ratios of angle in four quadrants.						
	5.3	Compound angle formulae.						
	5.4	Allied angle formulae.						
	5.5	Product formulae, Sum or difference formulae.						
	5.6	Multiple, submultiples angle formulae.						
	5.7	Inverse trigonometric functions.						
	5.8	Properties of triangle: sine rule, cosine rule. (without proof)						
6		Matrices	8	12	1	40%	40%	20%
	6.1	Matrices of order m x n, types of matrices, equality of matrices						
	6.2	Addition and subtraction of matrices, multiplication of matrices						
	6.3	Transpose of matrix, adjoint of matrix, inverse of matrix						
	6.4	Solution of simultaneous linear equations by adjoint method.						

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

List of Assignments/Tutorials:

Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1	1	Determinants	2	1
2	5	Circular measure of an angle, Trigonometric ratios	2	4
3	5	Compound angle formulae, Allied angle formulae	2	4
4	5	Product formulae, Sum or difference formulae.	2	4

5	2	Binomial Theorem.	2	2
6	5	Multiple, submultiples angle formulae.	2	4
7	5	Inverse trigonometric functions, Properties of triangle	2	4
8	6	Matrices	2	1
9	3	Straight lines	2	2
10	4	Complex Numbers	2	3

Reference books :

Sr. No.	Author	Title	Publisher and Edition
1	S. P. Deshpande	Mathematics for Polytechnic	Pune Vidyarthi Griha Prakashan.
2	H.K.Dass	Advanced Engineering Mathematics	S.Chand & Company Ltd. Delhi
3	Dr.B.S.Grewal	Higher Engineering Mathematics	Khanna Publishers Delhi

Curriculum Coordinator **Head Diploma in** **Dean - Diploma**

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE ★ MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: First
COURSE TITLE	: Physics – I
COURSE CODE	: 175PH12

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR*		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	5	3	80	32	20	100	40	25	10	-	-	25	10	150

*Practical examination will be conducted by internal examiner.

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.

Various phenomena, principles, laws, rules discovered and invented by physics are used for industrial, engineering and technological applications. The overall growth of various engineering disciplines, namely, mechanical, electrical, electronics, civil and environmental and so on depends upon the development of physics and its detail understanding.

Objectives:–

Students should be able to;

- identify different systems of units and convert units from one system to other as well as conversant with practical units.
- understand properties of matter such as elasticity, surface tension and viscosity, concepts, laws and rules used in static and current electricity, principles of heat and thermodynamics.
- analyze and use it for solving engineering problems.
- identify the phenomena of interference, diffraction and polarization of light and its industrial applications.
- identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

Course Outcomes:

Student should be able to

CO1	Use various systems for measurements and measuring instruments.
CO2	Understand properties of matter, elasticity, viscosity and surface tension, along with relevant formulae, applications and problem solving based on it.
CO3	Understand principles of heat and thermodynamics, their applications and numerical based on it.

CO4	Understand concepts, laws and rules used in static and current electricity; and apply it to solve problems based on it.

Course Content:

SECTION-I								
Unit & Sub-Unit		**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1.	Measurements		10	16	1	40%	40%	20%
	1.1	Need of measurements, requirements of standard unit, CGS, MKS, FPS and SI systems, fundamental and derived quantities/units, dimensions and dimensional analysis, problems						
	1.2	Vernier caliper, screw gauge, spherometer. Least counts and range of voltmeter, ammeter and thermometer.						
2.	Properties of matter		14	24	2	40%	40%	20%
	2.1	Elasticity – elasticity, plasticity, Hooke's law, Young's, Bulk and rigidity modulus, problems, relation between them, Searle's method of determination of Y, ultimate and breaking stress, factor of safety, wire under continuously increasing load.						
	2.2	Surface tension – cohesive and adhesive forces, sphere of influence, molecular theory of surface tension, angle of contact, capillarity (formula with derivation), problems						
	2.3	Viscosity – velocity gradient, Newton's law of viscosity, coefficient of viscosity, Stokes' law of viscosity, Stokes' method of viscosity, problems, laminar and turbulent flow, critical velocity, Reynold's number						
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**						
3	Heat and Thermodynamics		10	16	3	40%	40%	20%
	3.1	Gas laws – Boyle's law, Charle's law, Gay-Lussac's law, absolute zero, Kelvin scale, work done at constant pressure, Cp, Cv and Mayer's relation, problems, isothermal, adiabatic, isobaric and isochoric processes.						
	3.2	Expansion and transmission of heat – coefficients of linear, areal and cubical expansion, modes of transmission of heat, laws of thermal conductivity, coefficient of thermal conductivity, Lee's and Searle's methods, laws of thermodynamics, problems.						
4	Static and current electricity		14	24	4	40%	40%	20%
	4.1	Static electricity – Coulomb's law, one coulomb, electric field, electric potential, capacitor, problems						
	4.2	Current electricity – Ohm's law, one ohm, conductance, resistivity, conductivity, series and parallel combination of resistances, Wheatstone's bridge, Joule's law, potentiometer and its applications.						

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of Practicals

Sr. No.	Practicals	Approx. Hours	CO
1	Study of vernier caliper and travelling microscope	2	1
2	Study of screw gauge	2	1
3	Determination of viscosity of liquid by Stokes' method	2	2
4	Determination of surface tension of given liquid.	2	2
5	Thermal conductivity of good conductor by Searle's method	2	3
6	Thermal conductivity of bad conductor by Lee's method	2	3
7	To verify Ohm's law.	2	4
8	Use of meter bridge	2	4
9	Comparison of emfs of cells	2	4
10	Measurement of internal resistance of cell	2	4
* Minimum 8 practicals/experiment sessions to be included in a course in a term			

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	XIth standard physics book		HSC Board, M.S. / NCERT
2	XIIth standard physics book		HSC Board, M.S. / NCERT

Reference books and Websites:

Sr. No	Author	Title	Publisher and Edition
1	Halliday D., Resnik R. and Walker	Fundamentals of physics extended	Wiley India, New Delhi, 8th edition
2	Serway R A and Jewett, Jr. J W	Physics for scientists and Engineers	Cengage learning, New Delhi, 6th edition
3	Verma H C	Concepts of Physics – Part I and II	Bharti Bhavan, New Delhi

Curriculum Coordinator **Head Diploma in** **Dean - Diploma**

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: FIRST
COURSE TITLE	: BASIC CHEMISTRY
COURSE CODE	: 175CH13

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	0	2	5	3	80	32	20	100	40	25	10	-	-	25	10	150

Course Objectives:

1. To understand mole concept and volumetric analysis.
2. To represent the formation of bonds in molecules.
3. To describe the kinetics of reactions.

Course Outcomes:

Student should be able to

CO1	Solve the quantitative problems involving moles and concentrations of solution.
CO2	Use the basic principles of chemistry to predict the electronic configuration, chemical reactions and describe the chemical bonding in molecules.
CO3	Define and explain various concepts of acids and bases, define pH and correlate it with the nature of aqueous solutions- neutral, acidic or basic. Understand & calculate solubility product.
CO4	To describe how the order of each reactant appearing in the rate law is determined.
CO5	Apply the knowledge of electrolysis in engineering applications
CO6	To inculcate essential knowledge on theoretical and modern technological aspects of metallurgy.
CO7	Perform laboratory experiment demonstrating safe and proper use of standard chemistry glass ware and equipments
CO8	Record and interpret the data obtained from experimentation

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		**Solution**	06	10	1	40%	40%	20%
	1.1	Solution, Concentrations of solution: Grams per litre, Percentage by weight or volume, Normality, Morality, Molality.						
	1.2	Volumetric analysis, Titrations, Acid base titration, Acidimetry, Akalimetry, Redox titration, Iodometric titrations, Complexometric titration, Precipitation titration.						
2		**Atomic Structure**	10	15	2	40%	40%	20%
	2.1	Definitions of Elements, atoms, Molecules, Fundamental particles of atom, their mass, charge, location, Definition of atomic number, atomic mass number, Isotopes and Isobars, Electronic configuration based on Hunds Rule, Aufbau's principle, Pauli's exclusion principle (till Atomic no. 30),						
	2.2	Definitions: atomic weight, equivalent weights of an element, Molecular weight, Mole in terms of number, mass, volume, Definitions of equivalent weight and, Molecular weight of molecule,						
	2.3	Determination of percentage composition of an element in a given molecule,						
	2.4	Chemical bond, octet rule, formation of various types of chemical bonds: Covalent, Ionic, Coordinate covalent bonds along with examples CH_4, H_2, O_2, N_2, NaCl, $MgCl_2$, H_3O^+, NH_4^+, BF_3-NH_3						
3		**Acid, base and salts**	08	15	3	40%	40%	20%
	3.1	Definitions & theories of acids & bases:Classical theory, Arrhenius theory, Lowry-Bronsted theory,Lewis theory, pH, pOH, pH scale						
	3.2	Basicity of an acid and acidity of a base, Numericals of						

		Equivalent weight of acids, bases, Definition of salts & types of salts: Normal, Acidic, Basic, Mixed, Double salts, complex salts,						
	3.3	Electrolytes, Types of Electrolytes, Degree of dissociation, ostwalds dilution law, Hydrolysis & Degree of hydrolysis, common ion effect, solubility product and Numericals						
		SECTION-II						
Unit & Sub-Unit		**Topics/Sub-topics**						
4		**Chemical reactions & Chemical Kinetics**	06	10	4	**40%**	**40%**	**20%**
	4.1	Definition of Chemical reaction, types of chemical reaction, chemical equillibrium Le Chatelier's principle and its applicatios Rate of chemical reaction, Rate equation and rate law						
	4.2	Order of reaction, Molecularity of reaction, differential rate equations, pseudo order reactions.						
5		**Electrochemistry**	**08**	**15**	**5**	**40%**	**40%**	**20%**
	5.1	Electrochemistry, Electrochemical reactions, Construction and working of electrochemical cell & electrolytic cell,						
	5.2	Faradays I & II laws of electrolysis, Applications of electrolysis: electroplating & refining						
	5.3	Electrochemical cells and batteries, Construction, working and applications of dry cells, fuel cells						
6		**Metallurgy**	10	15	6	**40%**	**40%**	**20%**
	6.1	Introduction, general metallurgical operations: crushing & grinding, concentration of ore & refining of metals, important mechanical properties of metals. **Metallurgy of Iron:** Ores of iron, extraction of iron Physical, chemical properties–action of air, water, acid, alkali.						
	6.2	**Metallurgy of Aluminium:** Extraction process: Ores of aluminium, extraction of aluminium from bauxite by Bayer's process, electrolytic reduction of alumina, electrolytic refining of aluminium. Physical, chemical properties–action of air, water, acid, alkali. Applications of aluminium, anodizing of aluminium.						
	6.3	**Metallurgy of copper:** Extraction process: Ores of copper, extraction of						

		copper from copper pyrite by concentration, roasting, smelting, bessemerisation, electrolytic refining. Physical, chemical properties – action of air, water, acid, alkali. Applications of copper.						

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

List of Practicals/Assignments/Tutorials:

Sr. No.	Practical/Assignment	Approx. Hours	CO
1	To study the use of indicators, for identification of acid, base and neutral solutions from the given set of solutions.	2	7,8
2	To standardize HCl solution using N/10 Na_2CO_3.	2	7,8
3	To standardize $KMnO_4$ solution using N/10 $C_2H_2O_4$ solution.	2	7,8
4	To determine strength of the mixture of H_2SO_4 + $C_2H_2O_4$ using NaOH and $KMnO_4$ solution.	2	7,8
5	To determine the amount of ferrous sulphate or ferrous ammonium sulphates in the given solution using $KMnO_4$ solution.	2	7,8
6	To standardize $Na_2S_2O_3$ solution using N/10 $K_2Cr_2O_7$ solution.	2	7,8
7	To determine the amount of ferrous sulphate or ferrous ammonium sulphates in the given solution using $K_2Cr_2O_7$ solution.	2	7,8
8	To determine the amount of copper sulphate in the given solution using $Na_2S_2O_3$ solution.	2	7,8
9	To standardize EDTA solution using N/10 $ZnSO_4$ solution.	2	7,8
10	To standardize $AgNO_3$ solution using NaCl solution.	2	7,8
* Minimum 8 and maximum 12 practicals/experiment sessions to be included in a course in a term			

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	S. S. Dara & S. S. Umare	A Text Book of Engineering Chemistry	S. Chand & Company Ltd Ram nagar, New Delhi - 110 055 Edition: Twelfth (2010)

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	Jain & Jain	Engineering Chemistry	Dhanpat Rai & Co. (Pvt.) Delhi – 110006 Ltd Edition: Fifteenth (2008)
2	Shashi Chawla	A Text Book of Engineering Chemistry	Educational & Technica Publishers Dhanpat Rai & Co (Pvt.) Ltd, Edition: Third (2005)

Curriculum Coordinator **Head Diploma in Technical Chemistry** **Dean - Diploma**

DIPLOMA PROGRAMME	: DIPLOMA CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: FIRST
COURSE TITLE	: COMMUNICATION SKILLS I
COURSE CODE	: 175HM13x

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	0		3	80	32	20	100	40	-	-	-	-	25	10	125

Course Objectives: Cultivating writing skills in students by giving exposure to good language, enhancing the power of expression through vocabulary exercises, improving skills of composition, promoting coherence in thinking, assimilating and reproducing ideas and enabling the students to formulate grammatically correct sentences thereby developing their ability to communicate effectively in industry, professional fields , in academic and social circles .

- In order to develop the writing abilities in students textbooks that give exposure to language have been introduced.
- The tutorials have been incorporated to provide practice to the students to develop writing skills.
- Vocabulary exercises are given to enhance word power while writing .
- Grammar topics are taught by giving sufficient practice material to help them formulate grammatically correct sentences.
- Idioms , phrases and proverbs are introduced in order to acquire fluency and richness to their language while expressing ideas through writing .

Course Outcomes:

Student should be able to

CO1	To acquire the ability to formulate grammatically correct sentences
CO2	To improve power of expression in written communication
CO3	To develop coherence in thinking, comprehending and expressing one's ideas in one's own language

Course Content

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
I	1	**A)Modern Trailblazers- textbook 1** **B) Delights in prose- textbook 2** a) Five to six chapters from the prescribed textbooks b) Power point presentation based on texts as well as drawing parallels from industry c) Inviting speakers from the industry to deliver lectures connected with the topics in the text.	14	22	CO 3	30%	50%	20%
	2	**Word formation from the text.** a) Use of technical vocabulary b) correct spellings c) synonyms d) powerful expression	3	3	CO 2	20%	20%	60%
	3 A	**Short composition** a) **Paragraph writing** - Coherence - Correct grammar - good vocabulary - proper structure b) **Description** of an object or a product or a situation. -use of technical words - development of ideas	5	8	CO 3	20%	20%	60%
	3 B	**Comprehension passages** a) **Summarization** of passages in one's own words.(Newspaper articles, general articles etc)	4	7	CO 3	30%	50%	20%

		b) **Identifying the theme** of the passage precisely and enumerating the sub points						
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**						
II	**1**	**Vocabulary Building** **a)** Synonyms **b)** Antonyms **c)** Homophones **d)** One word substitutes **e)** Homonyms	**5**	**10**	**CO 2**	**20%**	**40%**	**40%**
	2	**A) Application of grammar** a) Correction of common errors in English b) Sentence structure **B) short official letters** a) leave applications b) seeking permission from authority c) grievance letter (campus situations)	**4** **6**	**15**	**CO 1**	**30%**	**50%**	**20%**
	3	**Use of refined language** a) Idioms b) Proverbs c) Phrases	**7**	**15**	**CO 2**	**40%**	**40%**	**20%**
	TOTAL		48	80				

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

List of Assignments/Tutorials:

Sr. No.	Practical/Assignment	Approx. Hours	CO
1.	Synonyms	2	CO 2
2.	Antonyms	2	CO 2
3.	Homophones	2	CO2
4.	Homonyms	2	CO 2
5.	One word substitute	2	CO 2

6	Phrases	2	CO2
7	Idioms	2	CO 2
8	Proverbs	2	
9	Sentence structure	2	CO 1
10.	Correction of Errors	2	CO 1
11	Comprehension a) Summarizing PPT Presentation b) Recapping the speech delivered	4	CO 3
12	Composition writing a) short letters	4	CO 3

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	Board of Editors – Chief Editor-Ajay R. Tengse	Delights in Prose	Orient Black Swan, First edition, 2014
2	Akshay V. Dhote Hitnedra V. Dhote	Modern Trailblazers	Orient Black Swan, First edition, 2013

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	Oxford	Dictionary	Oxford University
2	Sanghita sen Alankrita Mahendra Priyadarshi Patnaik	Communication Language and Skills	Cambridge university Press,First publisded, 2015
3	B.V Pathak	English semester I	Nirali Prakashan, Fourth Edition, 2007
4	Green David	Contemporary English Grammar, structure and composition	Macmillan, India, First edition, 2000
5	Raymond Murphy	Essential English Grammar	Cambridge

			university Press, third Edition, 2011

Curriculum Coordinators
1. **Vandana Mishra**
2. **Tanvi Joshi**

Head
(R.Thomas)
H&M Dept

Dean - Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
MATUNGA
MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: FIRST
COURSE TITLE	: CHEMISTRY OF ALIPHATIC COMPOUNDS
COURSE CODE	: 175CH15

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	0	2	5	3	80	32	20	100	40	25*	10	-	-	25 @	10	150

Course Objective:

1) The basic objective of this course is to provide a solid foundation of organic chemistry for students considering advanced studies in chemistry and other important areas such as industrial manufacturing and applied engineering chemistry that requires a thorough understanding of organic chemistry.

Course Outcomes:

Students will gain an understanding of:

CO1	Bonding in carbon compounds.
CO2	Classification and nomenclature the organic compounds. & types of chemical reactions.
CO3	Properties, reactions & application of aliphatic compounds
CO4	Perform qualitative analysis of organic compounds.

Students will gain an understanding of:

how to calculate a limiting reagent, yield, and percent yield

how to maintain a detailed scientific notebook

how to critically evaluate data collected to determine the identity, purity, and yield of products

how to summarize findings in writing in a clear and concise manner

how to use the scientific method to create, test, and evaluate a hypothesis

how to engage in safe laboratory practices handling laboratory glassware, equipment, and chemical reagents

including mp, bp, IR, NMR, GC

How to perform common laboratory techniques, including reflux, distillation,

steam distillation, recrystallization, vacuum filtration, aqueous extraction, thin layer chromatography, column chromatography

How to predict the outcome and mechanism of some simple organic reactions, using a basic understanding of the relative reactivity of functional groups

Course Content:

SECTION-I								
Unit & Sub-Unit		**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
1		**Bonding in organic compounds**	**6**	**10**	**1**	**40%**	**40%**	**20%**
	1.1	Characteristics of carbon atom general characteristics of organic compounds.						
	1.2	Methods of purification of organic compounds.						
	1.3	Empirical and molecular formula of organic compound, lewis dot structure.						
	1.4	Theory of chemical bonds. Types of bonds and hybridization.						
2		**Introduction to organic chemicals and Basics of Reaction mechanism.**	**6**	**10**	**2**	**40%**	**40%**	**20%**
	2.1	Classification and IUPAC nomenclature of organic compounds.						
	2.2	Fundamental concepts in organic reaction mechanism, inductive effect, hyper-conjugation						
	2.3	Types of organic reactions.						
3		**Aliphatic organic compouns properties and reactions**	**12**	**20**	**3**	**40%**	**40%**	**20%**
	3.1	alkanes: alkenes: alkynes: 1. properties and reactions						
	3.2	**Alcohols** 1. Classification 2. Synthesis methods 3. Properties.						
SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**						
5		**Aliphatic aldehydes, ketones and ethers** 1. Classification 2. Synthesis methods 3. Properties.	**08**	**15**	**3**	**40%**	**40%**	**20%**
	5.1	**Carbohydrates**						
		Introduction, classification of carbohydrates						

6		**Aliphatic acids and esters s**	08	15	3	40%	40%	20%
	6.1	1. Introduction, nomenclature, 2. General Methods of preparation 3. Properties						
7		**Aliphatic amines**	08	10	3	40%	40%	20%
	8.1	4. Classification of amines 5. Synthesis methods 6. Properties.						
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).								

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

List of Practicals/Assignments/Tutorials:

Sr. No.	Practical/Assignment	Approx. Hours	CO
1	Identifiaction of nature and functional groups of compound no-1	3	4
2	Identifiaction of nature and functional groups of compound no-2	3	4
3	Identifiaction of nature and functional groups of compound no-3	3	4
4	Identifiaction of nature and functional groups of compound no-4	3	4
5	Identifiaction of nature and functional groups of compound no-5	3	4
6	Identifiaction of nature and functional groups of compound no-6	3	4
7	Identifiaction of nature and functional groups of compound no-7	3	4
8	Identifiaction of nature and functional groups of compound no-8	3	4
9	Identifiaction of nature and functional groups of compound no-9	3	4
10	Identifiaction of nature and functional groups of compound no-10	3	4
* Minimum 8 and maximum 12 practicals/experiment sessions to be included in a course in a term			

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	Arun Bahl, B. S. Bahl	A Text Book Of Organic Chemistry	S Chand & Company Pvt Ltd. New Delhi, 15Th Edition 2000

Reference books and Websites:

Sr.	Author	Title	Publisher and Edition

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	Peter Syeax	Reaction Mechanism	

Curriculum Coordinator

Head
Diploma in Technical Chemistry

Dean - Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE
MATUNGA
MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: FIRST
COURSE TITLE	: Engineering Graphics-I
COURSE CODE	: 175ME16

TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
2	-	4	6	3	80	32	20	100	40	-	-	-	-	50	20	150

Course Objectives:

The student will able to

- Understand the fundamentals of Engineering Graphics
- Read and interpret object drawings.

Course Outcomes:

Student should be able to

CO1	To understand geometry of shapes, drawing conventions, definitions and drawing procedures.
CO2	To imagine shapes of solid objects in three dimensions and draw their different views.
CO3	To imagine internal details of solid objects from given views and use of drawing conventions.

Course Content:

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		**Drawing Instruments & their uses**	4	10	1	**30**	**30**	**40**
	1.1	Letters & Numbers (Single stroke Vertical)						
	1.2	Convention of Lines & it's applications						
	1.3	Geometrical Constructions involving construction of tangential arcs						
2		**Engineering Curves**	6	14	1	**40**	30	30

		3. Rectangle/Oblong Method 4. Eccentricity Method						
	2.3	Parabola by following MethodsEccentricity Method 1. Eccentricity Method 2. Rectangle Method						
	2.4	Hyperbola by Eccentricity Method Rectangular Hyperbola						
	2.5	Cycloid (Starting Point of the curve to be the point of contact at the beginning)						
	2.6	Involute of a circle (Full Involute only) Involute of a regular polygon						
	2.8	Helix on a cylinder						
3		**Projections of Points & Straight Lines** Reference Planes of projections – HP, VP & PP Orthographic Projections of Points, Projections of Straight Lines with lines inclined to both the reference planes.(Lines to be considered in first quadrant only. Simple problems excluding HT & VT of a line)	6	16	2	40	**30**	**30**

SECTION-II

Unit & Sub-Unit		Topics/Sub-topics						
4		**Projections of Planes** Projections of circular, square, rhombus, triangular, regular pentagonal & hexagonal plane surfaces with surfaces inclined to one reference plane & perpendicular to other. (excluding side view)	4	10	2	**40**	**30**	**30**
5		**Orthographic Projections** Simple Orthographic and Sectional Orthographic Projections of simple machine parts .(Full Section in one view)	10	30	3	**40**	**30**	**30**
6		**Introduction to Computer Drafting** Introduction to different commands in the drawing software	2	-	3	30	**30**	**40**

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1		**Drawing Instruments & their uses**	4	10	1	**30**	**30**	**40**
	1.1	Letters & Numbers (Single stroke Vertical)						
	1.2	Convention of Lines & it's applications						
	1.3	Geometrical Constructions involving construction of tangential arcs						
2		**Engineering Curves**	6	14	1	**40**	30	30
	2.1	Ellipse by following Methods 1. Arcs of Circles Method 2. Concentric Circles method 3. Rectangle/Oblong Method 4. Eccentricity Method						
	2.3	Parabola by following MethodsEccentricity Method 1. Eccentricity Method 2. Rectangle Method						
	2.4	Hyperbola by Eccentricity Method Rectangular Hyperbola						
	2.5	Cycloid (Starting Point of the curve to be the point of contact at the beginning)						
	2.6	Involute of a circle (Full Involute only) Involute of a regular polygon						
	2.8	Helix on a cylinder						
3		**Projections of Points & Straight Lines** Reference Planes of projections – HP, VP & PP Orthographic Projections of Points, Projections of Straight Lines with lines inclined to both the reference planes.(Lines to be considered in first quadrant only. Simple problems excluding HT & VT of a line)	6	16	2	40	**30**	**30**

SECTION-II

Unit & Sub-Unit		Topics/Sub-topics						
4		**Projections of Planes** Projections of circular, square, rhombus, triangular, regular pentagonal & hexagonal plane surfaces with surfaces inclined to one reference plane & perpendicular to other. (excluding side	4	10	2	**40**	**30**	**30**

		view)						
5		**Orthographic Projections** Simple Orthographic and Sectional Orthographic Projections of simple machine parts .(Full Section in one view)	10	30	3	**40**	**30**	**30**
6		**Introduction to Computer Drafting** Introduction to different commands in the drawing software	2	-	3	30	**30**	**40**
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).								

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1	A	Three sheets on problems from geometrical constructions, lettering & types of lines	10	1
	B	Five Sheets on the topic of Engineering Curves.	20	1
	C	Four Sheets on Projections of Points & Projections of Straight Lines.	10	2
	D	Three Sheets on Projections of Planes.	10	2
	E	Five Sheets on the topic of Orthographic Projections.	10	3
2		Demonstration of drafting software to the students.		

Note - The students should workout the problems on the following topics preferably on quarter imperial drawing sheets during the practical.

Text Books:

Sr. No.	Author	Title	Publisher and Edition
1	N.D.Bhatt	Engineering Drawing	Charotar Publishers 53rd Edition 2014
2	S.T.Ghan, M.V.Rawalani	Engineering Drawing	Nirali Publications Edition -2014/1

Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1	D.A.Jolhe	Engineering Drawing	TATA McGraw Hill- 2008
2	K.R.Mohan	Engineering Graphics	Dhanpatrai Publishing Co. Ist Edition-2009

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