



**Veermata Jijabai Technological Institute (V.J.T.I)**  
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Programme: Diploma in CHEMICAL ENGINEERING (DCHE)

Semester: II

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			
175MA21b	MATHEMATICS II	B	3	2	-	5	3	80	32	20	100	40	-	-	-	-	25	10	125
175PH22	PHYSICS II	B	3		2	5	3	80	32	20	100	40	25	10	-	-	25	10	150
175CH23	APPLIED CHEMISTRY	A	3	-	2	5	3	80	32	20	100	40	25	10	-	-	25	10	150
175HM24	TECHNICAL WRITING AND PRESENTATION SKILLS	A	-	3	2	5	-	-	-	-	-	-	50	20	25	10	50	20	125
175CH25	CHEMISTRY OF AROMATIC COMPOUNDS	B	3	-	3	6	3	80	32	20	100	40	25	10	-	-	25	10	150
175ME26	ENGINEERING GRAPHICS II	C	2	-	4	6		-	-	-	-	-	50	20	-	-	50	20	100
TOTAL			14	5	13	32	-	320	-	80	400	-	175	-	25	-	200	-	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)		



DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: SECOND
COURSE TITLE	: MATHEMATICS II
COURSE CODE	: 175MA21b

**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			
3	2	-	5	3	80	32	20	100	40	-	-	-	-	25	10	125

**Course Objectives:**

1. To lay a strong foundation in study of calculus which is the backbone for study in Engineering.
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 elementary operations and properties of vectors in engineering problems.
CO2	Use definition and formulae of function, limit, derivative and partial derivatives to solve the problems.
CO3	Use derivatives in applications.

**Course Content:**

SECTION-I							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1	Function	5	10	2	40%	40%	20%
	1.1	Definition of function.					
	1.2	Types of Functions: Polynomial, constant, explicit function, implicit function, periodic function, even and odd functions, inverse function, exponential function, logarithmic function, composite function					



	1.3	Simple problems based on function.						
2		Limit	10	12	2	40%	40%	20%
	2.1	Concept of limit of a function.						
	2.2	Theorems on limits (Without proof)						
	2.3	Limits of algebraic, trigonometric functions.						
	2.4	Standard limits						
3		Derivatives	11	18	2	40%	40%	20%
	3.1	Derivatives of standard functions by first principle.						
	3.2	Rules of differentiation.						
	3.3	Derivative of composite function. (chain rule).						
	3.4	Derivative of implicit function, parametric function.						
	3.5	Logarithmic differentiation.						
<b>SECTION-II</b>								
<b>Unit &amp; Sub-Unit</b>	<b>Topics/Sub-topics</b>							
4		Second ordered derivative.	2	6	2	40%	40%	20%
5		Applications of derivatives	10	16	3	30%	30%	40%
	5.1	Equation of tangent and normal to the given curve.						
	5.2	Maxima and minima of function.						
	5.3	Rate problems						
6		Partial derivatives of first order of functions of two variables.	2	6	2	40%	40%	20%
7		Vector Algebra	8	12	1	40%	40%	20%
	7.1	Definition of vector, types of vector, vector addition, subtraction, multiplication by scalar.						
	7.2	Dot product, cross product and their properties.						
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).								

#### List of Practicals/Assignments/Tutorials:

Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1	7	Vector	2	1
2	1	Function	2	2
3	2	Limits of algebraic functions.	2	2



4	2	Limits of trigonometric functions.	2	2
5	3	Derivative of composite function.	2	2
6	3	Derivative of implicit and parametric function.	2	2
7	4	Second ordered derivative. Equation of tangent	2	3
8	5	Maxima and minima of function. Rate problems	2	3
9	6	Partial derivatives	2	2

**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



DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: II
COURSE TITLE	: Physics – II
COURSE CODE	: 175PH22

### 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			
3	-	2	5	3	80	32	20	100	40	25	10	-	-	25	10	150

\*Practical examination will be conducted by internal faculty.

#### 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;

- Understand basics of crystal structures and types of simple cubic structures.
- identify the phenomena of interference, diffraction and polarization of light, properties and applications of sound, concepts used in modern physics and its industrial applications.
- analyze and use it for solving engineering problems.
- identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

#### Course Outcomes:

Student should be able to

CO1	Understand simple cubic structure and Miller indices.
CO2	Understand concepts used in various phenomena of optics, such as wave theory, interference, diffraction, polarization etc., along with their applications and problems based on it.
CO3	Understand longitudinal waves, their velocity, factors affecting velocity of sound, concept of resonance, laws of vibrating string, sonometer and resonance tube.
CO4	Understand concepts of modern physics used in X-rays and photoelectric effect, with their applications and problems based on it:

### Course Content:

SECTION-I								
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level	
1.	Crystal structure							
	1.1	Unit cell, Bravais lattice, basis, cubic structures, SC, BCC and FCC, lattice parameter and atomic radius in all three cases, number of lattice points per unit cell, co-ordination number, packing efficiency.	10	16	1	40%	40%	20%
	1.2	Miller directions, Miller indices, determination of miller indices from intercepts of plane, identification of Miller indices of a given plane, distance between planes						
2.	Optics							
	2.1	Wave theory – wavefront, wave normal, laws of reflection and refraction, problems, Huygen’s principle, dispersion, total internal reflection.						
	2.2	Interference – principle of superposition, constructive and destructive interference, conditions to obtain interference pattern, Young’s double slit experiment, derivation of bandwidth, problems.	14	24	2	40%	40%	20%
	2.3	Diffraction – definition, types of diffraction, single slit diffraction pattern, diffraction grating, grating element, grating formula, problems, determination of wavelength of light.						
	2.4	Polarization – polarized and unpolarized light, polarizer, analyzer, optical activity, optical rotation, specific rotation, polarimeter (principle, construction, working and applications)						
SECTION-II								
Unit & Sub-Unit	Topics/Sub-topics							
3	Sound							
		Transverse and longitudinal waves, velocity of sound, Newton’s formula and Laplace’s correction, effect of various factors on velocity of sound, stationary waves, transverse vibrations on string, laws of vibrating string, resonance, sonometer, resonance tube closed at one end, determination of velocity of sound using	14	24	3	40%	40%	20%
4	Modern physics							
	4.1	X-rays – Coolidge X-ray tube, continuous characteristic and X-rays, problems, properties and applications, Moseley’s law.	10	16	4	40%	40%	20%
	4.2	Photoelectric effect – Planck’s theory of radiation, Einstein’s photoelectric equation, problems, photocells – photo-emissive, photovoltaic and photoconductive (construction, working and applications)						
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).								

**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 simple cubic crystal structures.	2	1
2	Study of Miller planes	2	1
3	Determination of refractive index of glass using Snell's law.	2	2
4	Determination of wavelength of LASER.	2	2
5	Determination of grating element.	2	2
6	Determination of specific rotation of given liquid.	2	2
7	Verification of first law of vibrating string.	2	3
8	Verification of second law of vibrating string.	2	3
9	Determination of velocity of sound using resonance tube.	2	3
10	Calculation of densities of different crystal structures.	2	1

\* 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, 8 <sup>th</sup> edition
2	Serway R A and Jewett, Jr. J W	Physics for scientists and Engineers	Cengage learning, New Delhi, 6 <sup>th</sup> edition
3	Verma H C	Concepts of Physics – Part I and II	Bharti Bhavan, New Delhi

  
Curriculum Coordinator

Head  
Diploma in 

  
Dean - Diploma



DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: SECOND
COURSE TITLE	: APPLIED CHEMISTRY
COURSE CODE	: 175CH23

**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			
3	0	2	5	3	80	32	20	100	40	25	10	-	-	25	10	150

**Course Objectives:**

1. Implementing the knowledge for the utilization of water resources in engineering & trouble shooting 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.

**Course Outcomes:**

Student should be able to

CO1	Identify the properties of metals and alloys related to engineering applications.
CO2	Describe the method for removing hardness from water.
CO3	Select appropriate materials used in lubrication
CO4	Apply knowledge to enhance operative life span of engineering material & structure by various corrosion protective methods.
CO5	Understand the properties, Select and Use the polymeric materials in engineering applications.
CO6	Know properties and applications of different types of fuels.
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	<b>Alloys</b>	6	10	1	40%	40%	20%
1.1	Defination, purpose of alloy, Preparation methods, types: Ferrous & Non Ferrous alloy, Ferrous alloy: Steel, Alloy steel, Composition, Properties and uses						
1.2	Non Ferrous alloy: Alloy of Cu, Zn, Al, Sn, Pb Composition, Properties and uses						
2	<b>Water</b>	8	15	2	40%	40%	20%
2.1	Introduction, Hard and soft water, hardness and its determination (EDTA method only).						
2.2	boiler problems-scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention,						
2.3	Water softening processes – Lime – Soda process, Zeolite Permutit method, Ion exchange method and comparison of methods, Numerical problems on hardness by EDTA method.						
2	<b>Lubricants</b>	8	15	3	40%	40%	20%
2.1	Lubricant, Lubrication, Function of lubricant, Types of lubricants, Mechanisms of lubrication,						
2.2	Ideal lubricant and properties: Viscosity, Viscosity index, fire point, flash point, pour point, cloud point, Saponification value, Acid value.						
SECTION-II							
Unit & Sub-Unit	Topics/Sub-topics						
4	<b>Corrosion</b>	08	15	4	40%	40%	20%
4.1	Introduction, Types of corrosion (dry and wet corrosion), factors affecting the corrosion, types and mechanism of Atmospheric corrosion, oxide films,						
4.2	electrochemical corrosion, mechanism of electrochemical corrosion, types of electrochemical corrosion: galvanic corrosion and concentration cell						



		corrosion,						
	4.3	protective measures against corrosion: coatings (galvanic and zinc, organic coating agents, Electroplating, metal cladding,).						
5		<b>Polymers</b>	8	10	5	40%	40%	20%
	5.1	Polymer, Monomer, classification of polymers, Polymerisation, Addition and condensation polymerisation						
	5.2	Plastics: definition, types: thermosetting & thermo softening plastics, compounding of plastics, properties and applications of plastics,						
	5.3	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						
6		<b>Fuels</b>	10	15	6	40%	40%	20%
	6.1	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						
	6.2	Liquid Fuels: Petroleum: its chemical composition and fractional distillation, cracking of heavy oil residues – thermal and catalytic cracking, Gaseous Fuels: Composition and properties of Natural, coal gas, LPG						
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).								

*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
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1	To estimate the amount of iron in plain carbon steel alloy.	2	7,8
2	To estimate the amount of copper in Brass alloy	2	7,8
3	To estimate the amount of zinc in Brass alloy.	2	7,8
4	To estimate of hardness of water by EDTA complexometric titration.	2	7,8
5	To estimate amount of chloride in tap water by Mohr's Method	2	7,8
6	To determine saponification value of given oil.	2	7,8
7	To determine acid value of given lubricating oil.	2	7,8
8	To determine relative viscosity of given oil.	2	7,8
9	To determine flash point value of given lubricating oil using Able's apparatus.	2	7,8
10	To determine flash point value of given lubricating oil using Pensky Martin's apparatus.	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 & Technical 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	: SECOND
COURSE TITLE	: TECHNICAL COMMUNICATION AND PRESENTATION SKILLS
COURSE CODE	: 175HM24x

**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			
-	-	2		-										25	10	25

**Course Objectives:**

Making students proficient in oral skills through various activities that will enable them to perform efficiently during interviews, meetings, seminars, conferences, group discussions and in negotiations and conflict resolutions. Improving the technical communication through critical analysis of a situation, drawing appropriate conclusions, presenting them precisely . Developing the personality of the future technologists by inculcating proper interactive skills in them and improving their power of expression required for efficacious communication in verbal and non-verbal form to achieve success in professional world.

**Course Outcomes:**

Student should be able to

CO1	To develop oral skills and self confidence
CO2	To develop analytical ability and technical communication skills
CO3	To develop interactive skills and power of expression

**Course Content :**

Unit & Sub-Unit	Topics/Sub-topics		Hours	Marks	CO	R Level	U Level	A Level
UNIT	I. ORAL SKILLS a) Dialogue And Role Play	<ul style="list-style-type: none"> <li>To improve interactive skills &amp; conversational skills</li> </ul>	12	09	CO 1	30%	30%	40%



I	b) Group Discussion  c) Elocution d) Extempore	<ul style="list-style-type: none"> <li>Leadership qualities and Team spirit</li> <li>To boost self-confidence, Power of expression,</li> </ul>						
U N I T 2	<b>II. TECHNICAL COMMUNICATION</b>  a) Editing b) Critical-Analysis of articles /write up.  c) Report Writing /Drafting proposals	<ul style="list-style-type: none"> <li>Writing Sills</li> <li>To develop critical thinking and analytical ability.</li> <li>Developing technical communication and conciseness in writing</li> </ul>	10	07	CO 2	20%	20%	60%
U N I T 3	<b>III. GROOMING AND INTERACTIVE SKILLS</b>  a) Audio-visual Communication <ul style="list-style-type: none"> <li>➤ Language Laboratory</li> <li>➤ Power Point Presentation</li> <li>➤ Videos</li> </ul> b) Communication and Body language <ul style="list-style-type: none"> <li>➤ Kinesics</li> <li>➤ Haptics</li> <li>➤ Proxemics</li> <li>➤ Vocalics</li> <li>➤ Chronemics</li> </ul> c) Manners and Etiquette <ul style="list-style-type: none"> <li>➤ Table Manners</li> </ul>	<ul style="list-style-type: none"> <li>Acquiring refined language and self-learning techniques.</li> <li>Using technologies to collect, compile, analyse and present data precisely in an appealing manner.</li> <li>Developing ability to communicate efficiently and effectively.</li> <li>Moulding and enhancing one's</li> </ul>	10	09	CO 3	20%	30%	50%



	➤ Telephone Etiquettes	personality.						
	➤ Personal Grooming							
	➤ Voice Culture							
	Total	=	32	25				
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).								

*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:**

1. Writing a dialogue based on the given situation.
2. Dialogue delivery through Role Play
3. Conducting group discussion on a given topic
4. Writing critical analysis of an article
5. Writing short reports pertaining to industry
6. Drafting applications as per industry situations
7. Drafting proposals
8. Delivering a speech in public
9. Presentation skills through power point presentation on a given topic
10. Phonetics exercises in language laboratory

**Text Books:**

Sr. No.	Author	Title	Publisher and Edition
1.	Board of Editors L.V Shende, T.K Tytus, N.S Pathan, R.G Munghate, Azizul Hugue, Sambhaji Warkad	The Communicator	Orient Blackswan,2008
2.	L.V Shende, T.K Tytus, N.S Pathan, R.G Munghate, Azizul Hugue, Sambhaji Warkad	Vibrant English	Orient Blackswan,2013




**Reference books and Websites:**

Sr. No.	Author	Title	Publisher and Edition
1.	Gupta C. B.	Contemporary Management	APH, New Delhi, First edition, 1992
2.	Sekaran Uma	Organisational Behaviour	Tata Mcgraw Hill, New Delhi, Second edition, 2008
3.	Raman Meenakshi, Sharma Sangeeta	Technical Communication	OUP, India, Second impression, 2004
4.	K. Purushotham	English for Fluency	Orient Blackswan, 2013

Curriculum Coordinators	Head	Dean - Diploma
Vandana Mishra Tanvi Joshi	(R.Thomas) H&M Dept	



DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: SECOND
COURSE TITLE	: CHEMISTRY OF AROMATIC COMPOUND
COURSE CODE	: 175CH25

**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			
3	0	2	5	3	80	32	20	100	40	25*	10	-	-	25 @	10	150

**Course Objectives:**

1. Recognize and distinguish between aromatic and antiaromatic compounds by their structures.
2. Know the properties of aromatic and compounds, and the chemical consequences of aromaticity.
3. Recognize and be able to write the mechanism of electrophilic aromatic substitution
4. Be able to outline the completed electrophilic aromatic substitution reactions of the following types: halogenation, nitration, sulfonation, and Friedel-Crafts acylation & alkylation

**Course Outcomes:**

Student should be able to

CO1	Define aromaticity and related properties.
CO2	Predict products in electrophilic substitution reactions of benzene and other aromatic compounds.
CO3	Prepare derivatives and confirm the organic compounds
CO4	Characterize compounds by physical and spectroscopic means including mp, IR, NMR, GC, and MS.

**Course Content:**

SECTION-I								
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level	
1	<b>Aromaticity</b>	5	5	1	40%	40%	20%	
	1.1 Introduction, characteristics of aromatic compounds.							
	1.2 Nomenclature of benzene derivatives, method of preparation of benzene, its chemical properties,							
	1.3 Carbonization of coal, distillation of coal tar							





	1.4	Aromaticity ( Huckel rule)						
2		<b>Reactions of Benzene</b>	10	15	2	40%	40%	20%
	2.1	Substitution reactions like sulphonation, nitration, halogenation.						
	2.2	Addition reactions hydrogenation, halogenation						
3		<b>Phenols and naphthols</b>	4	10	2	40%	40%	20%
	3.1	Classification of phenols preparation and properties						
4		<b>Aromatic aldehyde and ketone</b>	4	10	2	40%	40%	20%
	4.1	Introduction to aldehyde and ketones methods of preparation.						
	4.2	Physical and chemical properties of aldehydes and ketone, uses.						

**SECTION-II**

Unit & Sub-Unit	Topics/Sub-topics							
5	<b>Aromatic amines</b>	05	10	2	40%	40%	20%	
	4.1	Classification, basicity of amines,						
	4.2	Physical and chemical properties of aniline						
	4.3	Uses.						
6	<b>Aromatic carboxylic acid</b>	4	10	2	40%	40%	20%	
	5.1	Introduction, method of preparation , physical , chemical properties of benzoic acid						
	5.2	Benzene dicarboxylic acid						
	5.3	method of preparation , physical , chemical properties of phthalic acid						
7	<b>Polynuclear hydrocarbon</b>	4	5	2	40%	40%	20%	
	6.1	Introduction,						
	6.2	Method of preparation, physical, chemical properties of naphthalene,anthracene, phenanthrene.						
8	<b>Spectroscopy</b>	10	15	4	40%	40%	20%	
	8.1	Introduction, general principles, beer's, Lambert laws,						
	8.2	Electromagnetic radiation, absorption and intensity shifts						
	8.3	Instrumentation, working, application of UV-Visible, IR, NMR, Mass spectroscopy						

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

*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 prepare acetanilide from amines	3	3
2	To prepare 1,3-dinitrobenzene from nitrobenzene	3	3
3	To prepare p-iodonitrobenzene from p-nitroaniline	3	3
4	To prepare orange II from sulphanilic acid	3	3
5	To estimate the amount of aniline present in the given solution	3	3
6	To estimate the amount of phenol present in the given solution	3	3
7	To estimate the amount of formaldehyde present in the given solution	3	3
8	To estimate the equivalent weight of water soluble /insoluble acid by alkalimetry.	3	3

\* 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
2			

### Reference books and Websites:

Sr. No.	Author	Title	Publisher and Edition
1			

  
Curriculum Coordinator

Head  
Diploma in Technical  
Chemistry

  
Dean - Diploma



DIPLOMA PROGRAMME	: DIPLOMA IN CHEMICAL ENGINEERING
PROGRAMME CODE	: DCHE
SEMESTER	: SECOND
COURSE TITLE	: Engineering Graphics-II
COURSE CODE	:175ME26

**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.
- To develop ability to handle and use drafting software

**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	<b>Projections of Solids</b> Projections of solids with axis inclined to one reference plane & parallel to other reference plane. (Solids – prisms, pyramids, cylinder, cone & cube)	8	16	2,3	40	30	30
2	<b>Sections of solids</b>	6	16	2,3	40	30	30



	(Straight) cutting planes perpendicular to one reference plane, True shape of section.(Solids with axis perpendicular to one reference plane) (Solids with axis perpendicular to one reference plane) (No problems with given true shape of section)						
3	<b>Development of lateral surfaces of cut solids</b>	4	8	2,3	40	30	30
	Development of lateral surfaces of solids cut with straight cutting plane only (No problems on reverse development).						
<b>SECTION-II</b>							
<b>Unit &amp; Sub-Unit</b>	<b>Topics/Sub-topics</b>						
4	<b>Pictorial Views</b> Isometric Views. (No problems with circular slots on inclined surfaces)	6	15	2	40	30	30
5	<b>Reading of Simple Orthographic Projections</b> Missing Views including Sectional Views of simple machine parts (Full Section in one view)	6	20	3	40	30	30
6	<b>Machine Elements- Free hand sketching.</b> I.S. Convention for internal & external threads, single start threads, hexagonal & square-nuts, bolts & washers; Set screws, conventions for drilled through & blind holes, tapped holes.	1	5	1	40	30	30
8	<b>Introduction to Computer Aided Drafting</b> Solving problems each on multi view orthographic projection including sectional orthographic projections, reading orthographic Projections & Isometric Views with the help of computer aided drafting.	1		2,3	40	30	30



**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	<b>Projections of Solids</b> Projections of solids with axis inclined to one reference plane & parallel to other reference plane. (Solids – prisms, pyramids, cylinder, cone & cube)	8	16	2,3	40	30	30
2	<b>Sections of solids</b> Sections of solids by different auxiliary (Straight) cutting planes perpendicular to one reference plane, True shape of section.(Solids with axis perpendicular to one reference plane) (Solids with axis perpendicular to one reference plane) (No problems with given true shape of section)	6	16	2,3	40	30	30
3	<b>Development of lateral surfaces of cut solids</b> Development of lateral surfaces of solids cut with straight cutting plane only (No problems on reverse development).	4	8	2,3	40	30	30
SECTION-II							
Unit & Sub-Unit	Topics/Sub-topics						
4	<b>Pictorial Views</b> Isometric Views. (No problems with circular slots on inclined surfaces)	6	15	2	40	30	30
5	<b>Reading of Simple Orthographic Projections</b> Missing Views including Sectional Views of simple machine parts (Full Section in one view)	6	20	3	40	30	30
6	<b>Machine Elements- Free hand sketching.</b> I.S. Convention for internal & external threads, single start threads, hexagonal & square-nuts, bolts & washers; Set screws, conventions for drilled through & blind	1	5	1	40	30	30

	holes, tapped holes.						
8	<b>Introduction to Computer Aided Drafting</b> Solving problems each on multi view orthographic projection including sectional orthographic projections, reading orthographic Projections & Isometric Views with the help of computer aided drafting.	1		2,3	40	30	30
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).							

*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	Eight sheets on projections of solids	16	1,2,3
	B	Five sheets on problems sections of solids	12	1,2,3
	C	Five sheet on problems on development of surfaces.	10	1,2,3
	D	Five sheets on isometric projections.	10	1,2,3
	E	Six sheets on problems from reading orthographic projections.	14	1,2,3
	F	One sheet on free hand sketches.	2	1

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.Bhat	Engineering Drawing	Charotar Publishers 53 <sup>rd</sup> Edition 2010
2	S.T.Ghan, M.V.Rawalani	Engineering Drawing	Nirali Publications Edition -2014/1

#### Reference books and Websites:

Sem II, DCHE, VJTI



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. 1 <sup>st</sup> edition-2009

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