

**1st Semester**  
**CURRICULAR STRUCTURE**  
**AND**  
**SYLLABI OF**  
**FULL-TIME DIPLOMA COURSES IN**  
**ENGINEERING & TECHNOLOGY**

EFFECTIVE FROM THE SESSION 2013-14



**WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION**

(A Statutory Body under West Bengal Act XXI of 1995)

“Kolkata Karigori Bhavan”, 2<sup>nd</sup> Floor, 110 S. N. Banerjee Road, Kolkata – 700013

**CURRICULAR STRUCTURE FOR PART – I (1<sup>st</sup> YEAR) OF THE  
FULL-TIME DIPLOMA COURSES IN ENGINEERING & TECHNOLOGY**

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
COURSE NAME: All Branches except Architecture, Photography and Printing Technology											
DURATION OF COURSE: 6SEMESTERS											
SEMESTER: FIRST											
BRANCH: Common for all branches except Architecture, Photography and Printing Technology											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	Communication Skill-I	3	2	2	-	10	20	30	70		100
2	Basic Physics	3	2	-	2	10	20	30	70	50	150
3	Basic Chemistry	3	2	-	2	10	20	30	70	50	150
4	Mathematics	5	4	1	-	10	20	30	70	-	100
5	Engineering Mechanics	4	3	1	-	10	20	30	70	-	100
6	Technical Drawing	4	2	-	3	5	10	15	35	50	100
7	Computer Fundamentals	2	1	-	3	-	-	-	-	50	50
8	Workshop Practice	2	-	-	3	-	-	-	-	50	50
<b>Total:</b>		<b>26</b>	<b>16</b>	<b>4</b>	<b>13</b>	<b>55</b>	<b>110</b>	<b>165</b>	<b>385</b>	<b>250</b>	<b>800</b>
STUDENT CONTACT HOURS PER WEEK:33 hrs											
Theory and Practical Period of 60 Minutes each.											
L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

## Syllabus for Communication Skills I

<b>Name of the Course: Communication Skills I</b>				
<b>Course Code:</b>		<b>Semester: First</b>		
<b>Duration:</b> 15 weeks		<b>Maximum Marks: 100</b>		
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Theory: 2 hrs./week		Mid Semester Exam.: 20 Marks		
Tutorial:2 hrs./week		Assignment & Quiz: 10 Marks		
Practical: -hrs./week		End Semester Exam.: 70Marks		
Credit: 3				
<b>Aim:</b>				
Sl. No.				
1.	Primarily to develop verbal communication skills in English among students.			
2.	Developing reading & writing skills in students, especially among students who lack confidence in communicating in English.			
3.	Developing listening and speaking skills.			
<b>Objective:</b>				
Sl. No.				
1.	To increase power of comprehending a written text.			
2.	Training to isolate important information from a written text and represent the same in note form.			
3.	Increase ability to write short paragraphs			
4.	To write technical reports.			
5.	To improve speaking skill of students through active listening & speaking practice.			
<b>Pre-Requisite:</b>				
Sl. No.				
1.	Knowledge of reading & writing English.			
2.	Knowledge of preliminary English grammar.			
<b>Contents (Theory)</b>			<b>Hrs./Unit</b>	<b>Marks</b>
Unit:1 Comprehending a text	1.1Identifying important information & keywords using SQ3R (i.e. <b>survey, question, read, recite, and review</b> ) or similar technique and linking words. 1.2Comprehension –Responding to multiple choice& short-answer questions from the text; making sentences with marked words from the text to bring out the meaning of the words, filling up gaps to complete information structure, Identifying central idea of the text.		8	20
Unit: 2 Note taking	2.1Communication using symbols & abbreviations. 2.2Communication using diagrams & charts.			

	2.3 Using mind-mapping to establish relationship among information 2.4 Using SQ3R(or similar) technique , mind mapping , symbols, abbreviations, diagrams & charts to represent important information from written text in note form	6	15
Unit: 3 Writing Technical Paragraphs	3.1 Developing notes into paragraph (that is, from given information in diagrams, pictures, charts & so on). Concept of Topic Sentence and Supporting sentences. The paragraph types are: i) Description of process and route; ii) Problem-Solution type; iii) Cause & Effect type; iv) Comparing & Contrasting type.	8	15
Unit:4 Writing Technical Reports	The reports should contain a Front Cover and Covering Letter i) Progress Reports ii) Industrial Accident Report iii) Feasibility Report	8	20
<b>Total</b>		<b>30</b>	<b>70</b>
<b>Text Books:</b>			
Name of Authors	Title of the Book	Edition	Name of the Publisher
Ghosh, Mukherjee & Ghosh (WBSCTE & The British Council)	English Skills for Technical Students		Orient Black Swan
P.C. Wren & H. Martin	High School English Grammar & Composition		S. Chand & Co. Ltd.
Dr. Sunita Mishra Dr. C. Muralikrishna	Communication skills for Engineers		Pearson 2012
<b>Reference Books:</b>			
Name of Authors	Title of the Book	Edition	Name of the Publisher
Sanjay Kumar & Pushp Lata	Communications Skills		Oxford University Press
Meenakshi Raman & Sangeeta Sharma	Technical Communication: Principles & Practice		Oxford University Press
M. Raman & S. Sharma	Technical Communication	2 <sup>nd</sup>	Oxford University Press
B.K. Mitra	Effective Technical		Oxford University Press

	Communication		
Duss&Duss	Comprehension Test Question Bunch		West Bengal Council Higher Secondary Education

**Suggested list of Assignments / Tutorial:**

Sl. No.	Topic on which tutorial is to be conducted
1.	A brief introduction to the process of communication (sender-encoding-message-decoding-receiver-encoding- feedback/response-decoding) and classification of skills in communication.
2.	How to introduce oneself, introducing friends, how to greet, how to bid goodbye
3.	Listening and viewing video clips to improve pronunciation and vocabulary (use of English language software is recommended).
4.	Analysing and commenting on situations shown in short video clippings/pictures
5.	Teaching etiquettes and interactions- wishing, drawing attention, seeking apologies, seeking permission and so on.
6.	Remedial grammar / Revision of English grammar (as required) in paragraph and report writing with special emphasis on voices, tenses, reported speech and preposition.

**Note:**

Sl. No.	
1.	Tutorials should primarily be used to develop listening and speaking skills and also to revise important topics in English grammar. The tutorial classes should be preferably conducted in the language lab.
2.	Question Paper setting tips i) No objective type questions are to be set separately. ii) Questions are to be set to examine the reading and writing skills of the students (that is, questions on the process & technics of communication, namely, communication models, SQ3R technic, mind-mapping, and so on are to be avoided). iii) All questions should be answered; however, options within a question may be given.

## Syllabus on BASIC PHYSICS

<b>Name of the Course:</b> <b>Subject : BASIC PHYSICS</b>	
<b>Course Code:</b>	<b>Semester: FIRST</b>
<b>Duration: 6 months</b>	<b>Maximum Marks: 100</b>
<b>Teaching Scheme</b>	<b>Examination Scheme</b>
Theory: 2 hrs./week	Mid Semester Exam.: 20 Marks
Tutorial: Nil	Attendance, Assignment & interaction: 10 Marks
Practical: 2 hrs./week	End Semester Exam.: 70 Marks
Credit: 3	
<b>Aim:</b>	
Sl. No.	
1.	To make the students of Engineering & Technology aware of the basic laws and principles of Physics and their applications in the field of Engineering & Technology.
2.	The goal of physics is to formulate comprehensive principles that bring together and explain the world around us.
3.	To establish the awareness about the power of Physics as a tool in the practicality of the life.
<b>Objective:</b>	
Sl. No.	Students will be able to
1.	<ul style="list-style-type: none"> <li>• Learn the use of Dimensional analysis in Physics and in engineering fields.</li> <li>• Estimate errors in measurement.</li> <li>• Select proper material for intended purpose by studying properties of materials.</li> <li>• Analyze surface tension property and properties of fluid.</li> </ul>
2.	<ul style="list-style-type: none"> <li>• Identify good &amp; bad conductors of heat.</li> <li>• Analyze laws of thermodynamics and to distinguish different thermodynamic processes.</li> </ul>
3.	<ul style="list-style-type: none"> <li>• Learn about measurement of light energy and the illumination produced by it.</li> <li>• Analyze the phenomenon of refraction and its consequences.</li> <li>• Identify the effect of interference between light waves.</li> <li>• Identify photo electric effect for engineering applications.</li> <li>• Enhance analytical approach in formulating and solving problems related to different physical situations.</li> </ul>
<b>Pre-Requisite:</b>	
Sl. No.	
1.	Basic Mathematics knowledge to solve the problems.
2.	Knowledge of basic concepts sciences such as physics, chemistry and mathematics
3.	Visualization and analytical approach towards the subject is necessary

End Semester Examinations Scheme. Maximum Marks – 70. Time allotted – 3 hrs.							
Group	Unit	Objective Questions (MCQ only with one correct answer)		Subjective Questions			
		No. of questions to be set	Total marks	No. of questions to be set	To answer	Marks per question	Total marks
A	1, 2, 3	12	20	5	3	10	50
B	4, 5	8		4	2		

- Only multiple choice type questions (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

	Content (Theory)	Hrs/Unit	Marks/Unit
Unit – 1 UNITS, DIMENSIONS & MEASUREMENTS	<p><b>1.1 System of units</b> – Need of measurement in engineering and science. CGS, MKS and SI. Fundamental and derived units (SI).</p> <p><b>1.2 Dimensions:</b> Dimensions of physical quantity. Principle of dimensional homogeneity (explanation with examples). Applications of dimensional analysis. Limitations of dimensional analysis.</p> <p><b>1.3 Estimation of errors:</b> Concept of significant figure. Absolute error, Relative or Proportional error and percentage error (concept only). Accuracy &amp; precision of instruments (concept only, examples only with slide calipers and screw gauge).</p>	4	10
Unit – 2 GENERAL PROPERTIES OF MATTER	<p><b>2.1 Elasticity:</b> Deforming force and restoring force. Elastic and plastic body. Stress and strain. Hooke's law. Stress – strain diagram. Young's modulus, Bulk modulus, Rigidity modulus and Poisson's ratio (definition and formula) and relation between them (no derivation). (Simple numerical problems).</p> <p><b>2.2 Surface tension:</b> Cohesive and adhesive forces. Definition, dimension and SI unit of surface tension. Surface energy (concept only). Angle of contact (definition only). Capillarity, shape of liquid meniscus in a capillary tube, rise of liquid in a capillary tube (no derivation, simple numerical problems). Effect of impurity and temperature on surface tension. Some natural examples of surface tension.</p> <p><b>2.3 Fluid Mechanics:</b> Pascal's law. Multiplication of force. Buoyancy. Conditions of equilibrium of floating</p>	8	20

	body. Archimedes' principle. [Simple numerical problems]. Streamline flow and turbulent flow of a fluid (concept), critical velocity (definition only). Equation of continuity and Bernoulli's theorem (statement and equation only, simple problems). Viscosity, Newton's formula for viscous force, co-efficient of viscosity (definition, dimension and SI unit). Stokes law (dimensional derivation) and terminal velocity (concept and formula only). Effect of temperature on viscosity.		
Unit – 3 HEAT AND THERMODYNAMICS	<p><b>3.1 Thermal expansion of solid:</b> Linear, areal and cubical expansion and their coefficients (definition and formula) and their relation (no derivation). Change of density with temperature (formula only). (Simple numerical problems).</p> <p><b>3.2 Transmission of heat:</b> Conduction, convection and radiation (differences). Thermal conductivity (formula, definition, dimensions and SI unit). (Simple formula based numerical problems including composite slab). Examples &amp; use of good and bad conductor of heat.</p> <p><b>3.3 Thermodynamics:</b> Zeroth law of thermodynamics. Temperature and internal energy (concept only). First law of thermodynamics (statement and equation only). Specific heats of gas, their relation (no derivation) and their ratio. Isothermal, isobaric, isochoric and adiabatic process (definition only).</p>	5	12
Unit – 4 LIGHT	<p><b>4.1 PHOTOMETRY:</b> Luminous flux, luminous intensity, illumination and their S.I. units — Principle of Photometry (statement only).</p> <p><b>4.2 REFRACTION OF LIGHT:</b> Refraction of light through plane surface. Laws of refraction. Refractive index -- Relative &amp; Absolute, its relation with the velocity of light in different media. Total internal reflection and critical angle. Optical fibre (Principle &amp; applications – mention only).</p> <p><b>4.3 OPTICAL LENS:</b> Lens and definition of related terms (Recapitulation). Cartesian sign convention. Lens maker's formula (no derivation). Relation between <math>u</math>, <math>v</math>, <math>f</math> (usual symbols) (no derivation). Principle of magnifying glass. Power of a lens and its unit. Equivalent focal length &amp; power of two thin lenses in contact (formula only). (Simple numerical problems).</p> <p><b>4.4 WAVE THEORY OF LIGHT &amp; INTERFERENCE:</b> Huygen's wave theory, wave front – spherical, cylindrical and plane wave front (Idea only). Huygen's principle of propagation of wave front. Analytical expression for 1D</p>	11	24



	plane light wave. Principle of superposition of waves. Coherent sources (Idea only). Interference of light waves, constructive and destructive interference. Young's double slit experiment – analytical treatment.		
Unit – 5 MODERN PHYSICS	<b>PHOTOELECTRIC EFFECT:</b> Photoemission, Work function. Photoelectric current, its variation with intensity and frequency of incident radiation. Stopping potential, Threshold frequency. Concept of photon. Einstein's photoelectric equation. Principle of solar photo-voltaic cell and its uses.	2	4
	TOTAL	30	70

**Practicals:**

Sl. No.	Skills to be developed
1.	<b>1) Intellectual skills-</b> <ul style="list-style-type: none"> <li>• Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.</li> <li>• Analyze properties of matter &amp; their use for the selection of material.</li> <li>• To verify the principles, laws, using given instruments under different conditions.</li> <li>• To read and interpret the graph.</li> <li>• To interpret the results from observations and calculations.</li> </ul>
2.	<b>2) Motor skills-</b> <ul style="list-style-type: none"> <li>• Proper handling of instruments.</li> <li>• Measuring physical quantities accurately.</li> <li>• To observe the phenomenon and to list the observations in proper tabular form.</li> <li>• To adopt proper procedure and precautions while performing the experiment.</li> <li>• To plot the graphs</li> </ul>

**Examination scheme: Maximum marks: 50**

- **Continuous Internal Assessment:** 25 marks.
- **External Assessment:** Marks – 25. Time allotted – 2 hrs. External teacher will assess the students. Each student will have to perform one experiment allotted on lottery basis.  
**Distribution of marks:** Theory – 5. Table, units & data taking – 10. Viva – Voce – 10.

**Laboratory Experiments :**

Sl. No.	At least six experiments to be performed
1.	• Determination of volume of the material of a hollow cylinder by using slide calipers.
2.	• Determination of area of cross-section of a wire / thin solid rod by using a screw gauge .Estimate the maximum proportional error in the measurement.
3.	• Determination of the specific gravity of a solid, insoluble in water and heavier than water, by hydrostatic balance.
4.	• Determination of the specific gravity of sand by specific gravity bottle.
5.	• Verification of Boyle's law by Boyle's law apparatus.
6.	• Verification of laws of refraction of light and determination of refractive index of glass

7.	<ul style="list-style-type: none"> <li>Determine of focal length of a convex lens by U-V method.</li> </ul>
8.	<ul style="list-style-type: none"> <li>Determination of the Young's modulus of steel by Searl's method.</li> </ul>
9.	<ul style="list-style-type: none"> <li>Determination of the surface tension of water by capillary rise method (Capillary tube &amp; radii to be supplied).</li> </ul>
10.	<ul style="list-style-type: none"> <li>Determination of coefficient of viscosity of given highly viscous liquid by Stoke's method (Radii &amp; density of the balls and density of the liquid to be supplied).</li> </ul>

**Text and reference books:**

Sl. No.	Title of the Book	Name of Authors	Publisher
1.	Physics – I & II	Resnik & Halliday	Wily Eastern Ltd.
2.	Physics. Part – I & II		NCERT
3.	Applied Physics	Arthur Beiser	Tata McGraw- Hill
4.	Physics - I	V. Rajendram	Tata McGraw- Hill Pub.
5.	Engineering Physics	Avadhanulu, Kshirsagar	S. Chand Publication
6.	Concept of Physics. Vol.- I & II	H. C. Verma	Bharati Bhavan Pub. & Distribution
7.	B. Sc. Physics. Vol.- I & II	C. L. Arora	S. Chand & Co. Ltd.
8	Engineering Physics	R. K. Gaur & S. L. Gupta	Dhanpat Rai Pub.
9	University Physics	Young	
10.	ABC of Physics	S. K. Gupta	Modern Publisher, New Delhi
11.	General Properties of matter	D. S. Mathur	S. Chand & Co. Ltd.
12.	Text Book of ISC Physics	Bhatnagar	Selina Publication
13.	A Text Book of Light	B. Ghosh & K. G. Majumder	Sreedhar Pub.
14.	Elements of H. S. Physics-I & II	Dutta & Pal	Publishing Syndicate
15.	H. S. Physics. Vol.- I & II	Duari, Maity & Majumder	Chhaya Prakashani
16.	H. S. Physics – I & II	C. R. Dasgupta	Pub.Book Syndicate
18.	Senior Practical Physics	A.S. Vasudeva	S. K. Kataria & Sons
19.	Elements of Physics-1	Dr. Subrata Kamilya	Knowledge Group Publications
20	Engineering Physics	JOSHI	Tata McGraw- Hill
21	Engineering Physics	MALIK	Tata McGraw- Hill
22	Physics 1	Basak (WBSCTE Series)	Tata McGraw- Hill

**List of equipment / apparatus for laboratory experiments :**

Sl. No.	Name of equipment / apparatus	
1	Vernier calipers	
2	Screw gauge	
3	Physical balance	
4	Boyle's law apparatus	
5	Glass slab	
6	Optical bench	
7	Searl's apparatus for Young's modulus	
8	Travelling microscope	
9	Stoke's law apparatus	

## Syllabus for: Basic Chemistry

<b>Name of the Course: All Branches of Diploma in Engineering And Technology (Basic Chemistry)</b>			
<b>Course Code:</b>		<b>Semester:</b> first	
<b>Duration:</b> : Seventeen weeks		<b>Maximum Marks:</b> 100	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Theory: 2 hrs./week		Internal Examination: 20Marks	
Tutorial: Nil hrs./week		Attendance+Assignment + interaction :10 Marks	
Practical: 2 hrs./week		Final Examination: 70Marks	
Credit:			
<b>Aim:</b>			
Sl. No.	The Students will be able to:		
1.	To apply the knowledge of chemical and physical properties and processes in engineering field.		
2.	The content of this subject provides knowledge of engineering materials.		
<b>Objective:</b>			
Sl. No.	The students are likely to acquire the following skills at the end of the course:		
1.	<ul style="list-style-type: none"> <li>• To draw the atomic structure of different elements.</li> <li>• To represent the formation of molecules schematically.</li> </ul>		
2.	<ul style="list-style-type: none"> <li>• To describe the mechanism of electrolysis.</li> <li>• To identify the properties of metals &amp; alloys related to engineering applications.</li> </ul>		
3.	<ul style="list-style-type: none"> <li>• To identify the properties of non metallic materials related to engineering applications.</li> </ul>		
4.	<ul style="list-style-type: none"> <li>• To acquire the knowledge of softening treatment of water in industry.</li> <li>• To know basic organic compounds applicable to industry.</li> </ul>		
<b>Pre-Requisite: Nil</b>			
<b>GROUP: A</b>			<b>Hrs./Unit</b>
<b>Marks</b>			
Unit: 1 Name of the Topics: Atomic Structure and Chemical Bonding	<p><b>Atomic Structure</b> : Bohr model of atom [ Radius and Energy of H – atom is excluded ] , De Broglie modification, Quantum numbers, Orbits and Orbitals, Aufbau principal, Pauli’s Exclusion principle, Hund’s rule of maximum multiplicity, Electronic configuration of elements upto atomic number 36. Definition of Atomic number, Mass number, Isotopes, Isotones and Isobars with suitable examples.</p> <p>Concept of hybridization <math>sp^3</math>, <math>sp^2</math>, <math>sp</math> and shape of molecules (simple example <math>H_2O</math>, <math>NH_3</math>, <math>BCl_3</math>, <math>BeCl_2</math>)</p> <p><b>Chemical Bonding:</b> Electrovalent, Covalent and coordinate bonds, H-bond in HF, water and ice. Classification of solids – crystalline and amorphous. Relationship between structure and properties of the following crystalline solids- (i) Ionic solid i.e. Sodium chloride (ii) Covalent solid i.e. diamond and graphite</p>	<b>6</b>	<b>12</b>

	(iii) Molecular solids i.e. metallic bonds and related properties. Properties and uses of Carbon, Silicon and Germanium.		
Unit: 2 Name of the Topics: Avogadro Concept , Acids , Bases & Salts	Avogadro number, Mole concept, Simple numerical problems involving Weight and volume. Acids, Bases and Salts (Arrhenius and Lewis concept) Basicity of acids and Acidity of bases, Neutralization reaction, Hydrolysis of Salts,. Equivalent Weight of acids, bases, & salts of Strength of Solution ---- normality, molarity, molality, formality and percentage strength, standard solution primary and secondary standards, concept of pH, and pH scale, Indicators and choice of indicator, principles of acidimetry and alkalimetry (simple numerical problems) Buffer solution (excluding numerical problems) Solubility product principle (excluding numerical problems), common ion effect with relation to group analysis.	4	12
<b>Total</b>			
<b>GROUP – B</b>			
Unit: 3	<p><b>3.1 Oxidation, Reduction, Electrochemistry</b></p> <p>Oxidation and Reduction by electronic concept, balancing chemical equations by Ion-electron method, Redox Titration, Electrolysis, Arrhenius theory, Faraday's Laws, Electrolysis of CuSO<sub>4</sub> solution using Pt-electrode and Cu-electrode, simple numerical problems on electrolysis, Application of electrolysis such as Electroplating, Electrorefinings and Electrotyping, Electrochemical Cells, Primary Cell- Dry Cell, Secondary Cell --- Lead storage cell, Electrochemical series.</p> <p><b>3.2 Chemical Equilibrium</b></p> <p>Reversible and irreversible reactions, Exothermic and Endothermic reactions, concept of chemical equilibrium, Lechatelier's principle, Industrial preparation of Ammonia by Haber's Process, Nitric acid by Ostwald's process and Sulphuric acid by Contact Process (Physico chemical principles only), catalyst and calalysis.</p>	4	8
		3	8
Unit: 4 Name of the Topics:	Minerals, Ores, Gangue, Flux, Slag, General method of extraction of metals with reference to Iron,	5	12

<b>Metallurgy</b>	copper and Aluminium (detailed method of extraction is excluded) Definition of Alloy, purposes of making Alloy, Composition and uses of alloys (Brass, Bronze German Silver, Deuralumin, Nichrome, Bell metal, Gun metal, Monel metal, Alnico, Dutch metal, Babbit metal, stainless steel), Amalgams, properties and uses of cast iron, wrought iron, steel and sponge iron , Manufacture of steel by L-D process, composition and uses of different alloy steels.		
<b>Unit: 5</b> Name of the Topics: <b>Water</b>	Soft and Hard water, Action of soap on water, Types of Hardness, causes of hardness, Units of hardness, Disadvantages of using hard water, Estimation of total hardness by EDTA method, Removal of hardness --- Permutit process, Ion-exchange process, phosphate conditioning and calgon treatment. Distilled water and Deionised water.	<b>3</b>	<b>8</b>
<b>Unit: 6</b> Name of the Topics: <b>Organic Chemistry</b>	Organic compounds, their differences from inorganic compounds, Classification, Homologous series, Functional groups, Isomerism, Nomenclature up to C5 , properties and preparation of Methane, Ethylene and Acetylene, Methylated spirit, Rectified spirit, Power alcohol, Proof spirit, uses of Benzene, Naphthalene and phenol, Chromatographic techniques of separation of organic compounds (Thin-Layer Chromatography).	<b>5</b>	<b>10</b>
<b>Laboratory Experiments :</b>			
Sl. No.			
<b>1</b>	To identify the following Basic Radicals by dry and wet tests – $Pb^{+2}$ , $Cu^{+2}$ , $Al^{+3}$ , $Fe^{+3}$ , $Zn^{+2}$ , $Ni^{+2}$ , $Ca^{+2}$ , $Mg^{+2}$ , $Na^{+}$ , $K^{+}$ , $NH_4^{+}$		
<b>2</b>	To identify the following Acid Radicals by dry and wet tests – $Cl^{-}$ , $CO_3^{-2}$ , $SO_4^{-2}$ , $S^{-2}$ , $NO_3^{-}$		
<b>3</b>	To identify an unknown water soluble salt containing one basic and one acid radical as mentioned above.		

4	To perform titration of (N/10) approximate solution of an alkali with an unknown solution of an acid supplied.		
5	To determine Iron content in Mohr's salt by standard K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> solution.		
6	Preparation of Potash Alum.		
<b>Text Books:</b>			
Name of Authors	Title of the Book	Name of the Publisher	
S. S. Dara	Environmental chem. & pollution control	S. Chand Publication	
Dr. Aloka Debi	A Text Book of Env. Engg.	Dhanpat Rai Publishing Co.	
Jain & Jain	Engg. Chem.	Dhanpat Rai Publishing Co.	
Madhusudan Chowdhury	Chem I & II	Naba Prakashani	
Dr. Kaberi Bhattacharya	Chem I & II	Lakshmi Prakasani	
Dr. Aloka Debi	Chem I & II	Bhagabati Prakasani	
<b>Reference Books:</b>			
Name of Authors	Title of the Book	Name of the Publisher	
Jain & Jain	Engg. Chem.	Dhanpat Rai Publishing Co.	
Dr. Aloka Debi	A Text Book of Env. Engg.	Dhanpat Rai Publishing Co.	
Shrieve Atkins	Industrial Chem		
Bahl & Bahl	A Text Book of Organic Chemistry	S. Chand Publication	
M. M. Uppal	Engg. Chemistry		
S. N. Poddar & S. Ghosh	General & Inorganic. Chemistry	Book Syndicate Pvt. Ltd.	
Harish Kr. Chopra	Engg. Chemistry	Narosha Publishing House	
Anupama Parkar	A Text Book		
B. K. Sharma	Industrial Chemistry	Goel Publishing House	
Dilip Basu	Polytechnic Chemistry-!	Knowledge Kit Publication	

## Syllabus for Mathematics

Name of the Course : <b>MATHEMATICS</b> (First Semester all branches)	
Course Code : */1/T4/MTHS	Semester : First
<b>Duration : 15 weeks</b>	<b>Maximum Marks : 100</b>
<b>Teaching Scheme :</b>	<b>Examination Scheme :</b>
Theory : 4 contact hours/week.	Internal Examination : 20 Marks
Tutorial : 1 contact hour /week	Class Attendance : 5 Marks
Practical : NA	End Semester Examination : 70 Marks
Credit : 5	Teacher's Assessment : 5 Marks
<b>Aim :</b>	
1.	To develop logical & precise thinking ability.
2.	To make the student aware about the utility of mathematics as a tool for solving scientific & engineering problems.
3.	
<b>Objectives – The student will be able to</b>	
1.	Develop an analytical & systematic approach towards solving any problem.
2.	Appreciate the power of mathematics in inter-disciplinary applications.
3.	Visualize various abstract concepts using mathematics as a tool.
<b>Pre-Requisite -</b>	
1.	Basic mathematical terms & formulae should be known.
2.	Knowledge of basic mathematical concepts are also necessary.
3.	

Content (Name of Topic)		Periods	
<b>Group - A</b>			
Unit 1	<b>ALGEBRA</b>	<b>21</b>	
	<b>1.1 Logarithm</b>		
	1.1.1 Definition of natural and common Logarithm	3	
	1.1.2 Laws of Logarithm. Simple Problems.		
	<b>1.2 Complex Numbers</b>		
	1.2.1 Definition of Complex numbers, Cartesian and polar. Exponential forms of complex numbers.		
	1.2.2 Modulus, amplitude & conjugate of a complex number	6	
	1.2.3 Algebra of Complex numbers (Equality, Addition, Subtraction, Multiplication).		
	1.2.4 Cube roots of unity & its properties.		
	1.2.5 De Moivre's theorem (statement only) and simple problems.		
	<b>1.3 Quadratic Equations</b>		
	1.3.1 Definition of Quadratic Equations	4	
	1.3.2 Analysing the nature of roots using discriminant		
	1.3.3 Relation between roots & coefficients		
	1.3.4 Conjugate roots		
	<b>1.4 Binomial Theorem</b>		
	1.4.1 Definition of factorial notation, definition of permutation and combination with formula	4	
	1.4.2 Binomial theorem for positive index (statement only)		

	1.4.3 General term and middle term. 1.4.4 Binomial theorem for negative index (statement only).		
	<b>1.5 Partial Fraction</b> 1.5.1 Definition of polynomial fraction, proper & improper fractions and definition of partial fractions 1.5.2 Resolving proper fractions into partial fractions with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors.	4	
<b>Unit 2</b>	<b>Vector Algebra</b>	<b>10</b>	
	2.1 Definition of a vector quantity. 2.2 Concept of Position vector and Ratio formula. 2.3 Rectangular resolution of a vector. 2.4 Algebra of vectors – equality, addition, subtraction & scalar multiplication. 2.5 Scalar (Dot) product of two vectors with properties. 2.6 Vector (cross) product of two vectors with properties. <b>2.7 Applications</b> 2.7.1 Application of dot product in work done by a force and projection of one vector upon another. 2.7.2 Application of cross product in finding vector area and moment of a force.		
<b>Group - B</b>			
Unit 3	<b>TRIGONOMETRY</b>	<b>10</b>	
	3.1 Trigonometric Ratios of associated, compound, multiple and sub-multiple angles. 3.2 Inverse trigonometric functions – Definition, formulae and simple problems. 3.3 Properties of Triangle – sine, cosine and tangent formulae - Simple Problems.		
Unit 4	<b>COORDINATE GEOMETRY &amp; MENSURATION</b>	<b>13</b>	
	<b>4.1 Co-ordinate System</b> 4.1.1 Cartesian & Polar co-ordinate system 4.1.2 Distance formula and section formula 4.1.3 Area of a triangle and condition for collinearity.	2	
	<b>4.2 Straight Line</b> 4.2.1 Equation of straight line in slope point form, intercept form, two-point form, two-intercept form, normal form. 4.2.2 General equation of a straight line. 4.2.3 Angle between two straight lines – Condition for parallelism and perpendicularity. 4.2.4 Length of perpendicular from a point on a line. Perpendicular distance between two parallel lines.	3	
	<b>4.3 CIRCLE</b> 4.3.1 Equation of circle in standard form, centre-radius form, diameter form, two-intercept form. 4.3.2 General equation of circle with a given centre and radius. Simple Problems.	3	



	<b>4.4 Conic Section</b> 4.4.1 Standard equations of parabola, ellipse & hyperbola. 4.4.2 Definition of focus, vertex, directrix, axes, eccentricity. Simple problems.	2	
	<b>4.5 MENSURATION</b> 4.5.1 Regular Polygon of n sides – Formula for area and perimeter. 4.5.2 Prism and Pyramid – Formula for volume & Surface area. Simple Problems.	3	
<b>Group - C</b>			
Unit 5	<b>FUNCTION, LIMIT &amp; CONTINUITY</b>		
	<b>5.1 Function</b>	3	
	5.1.1 Definitions of variables, constants, open & closed intervals.		
	5.1.2 Definition & types of functions – Simple Examples		
	<b>5.2 Limits</b>	4	
	5.2.1 Concept & definition of Limit.		
	5.2.2 Standard limits of algebraic, trigonometric, exponential and logarithmic functions.		
	5.2.3 Evaluation of limits.		
	<b>5.3 Continuity</b>	2	
	5.3.1 Definition and simple problems of continuity.		
Unit 6	<b>DERIVATIVE</b>	<b>12</b>	
	6.1 Definition of Derivatives, notations.		
	6.2 Derivative of standard functions.		
	6.3 Rules for differentiation in case of sum, difference, product and quotient of functions.		
	6.4 Derivative of composite functions (Chain rule).		
	6.5 Derivatives of inverse trigonometric functions.		
	6.6 Derivatives of implicit functions.		
	6.7 Logarithmic derivatives.		
	6.8 Derivatives of parametric functions.		
	6.9 Derivative of one function with respect to another function		
	6.10 Second order derivatives.		
	<b>6.11 Applications of Derivatives.</b>		
	6.11.1 Geometric meaning of derivative.		
	6.11.2 Rate measurement		
	6.11.3 Maxima & Minima (one variable)		
	Total	<b>75</b>	

## EXAMINATION SCHEME

Internal Examination : Marks – 20

Marks on Attendance : 05

Final Examination : Marks – 70

Teacher's Assessment : 05

Group	Unit	Objective Questions			Total Marks
		To be Set	To be Answered	Marks per Question	
A	1,2	12	Any Twenty	1	20 x 1 = 20
B	3,4	7			
C	5,6	6			

Group	Unit	Subjective Questions			Total Marks
		To be Set	To be Answered	Marks per Question	
A	1,2	4	Any Five Taking At Least One From Each Group	10	5 x 10 = 50
B	3,4	3			
C	5,6	3			

Note 1 : Teacher's assessment will be based on performance on given assignments & quizzes.

Note 2 : Assignments may be given on all the topics covered on the syllabus.

<b>Text Books</b>			
	Name of Authors	Title of the Book	Publisher
	B.K. Paul	Diploma Engineering Mathematics (Vol-1)	U.N. Dhar & Sons
	A. Sarkar	Mathematics (First Semester)	Naba Prakashani
	G.P. Samanta	A Text Book of Diploma Engineering Mathematics, Volume-1	Learning Press
	Dr. S. Bose & S. Saha	A Complete Text Book of Mathematics	Lakshmi Prakasan
<b>Reference Books</b>			
	H.S. Hall & S.R. Knight	Higher Algebra	Book Palace, New Delhi
	S.L. Loney	Trigonometry	S. Chand & Co.
	H.K. Dass	Engineering Mathematics	S. Chand & Co.
	T.M. Apostol	Calculus, Volume-1	John Wiley & Sons
	B.K.Pal, K.Das	Engineering Mathematics, Volume-1	U.N. Dhar & Sons
	B.C. Das & B.N. Mukherjee	Differential Calculus	U.N. Dhar & Sons
	KAR	Engineering Mathematics	Tata McGraw- Hill
	SINGH	Engineering Mathematics	Tata McGraw- Hill

## Syllabus of Engineering Mechanics

Name of the Course: <b>Engineering Mechanics</b>			
Course Code:		Semester: First	
Duration: 15 Weeks		Maximum Marks: 100	
Teaching Scheme		Examination Scheme	
Theory: 3 hrs/week		Internal Examination: 20	
Tutorial: 1 hrs/week		Assignment & Quiz: 10	
Practical: hrs/week		End Semester Exam:70	
Credit: 4			
Aim:			
<ol style="list-style-type: none"> <li>1. To study and realize the action of force system &amp; moment on a rigid body.</li> <li>2. To study the concept of Centroid &amp; Centre of gravity.</li> <li>3. To study the law of motion of simple lifting machine.</li> <li>4. To study the effect of friction on a body.</li> <li>5. To prepare the students for further understanding of other allied subjects (e.g. SOM, TOS, MOM,TOM, DOM, DOS).</li> </ol>			
Objective: The students will be able to			
<ol style="list-style-type: none"> <li>1. Make composition of forces, resolution of force, and find resultant and equilibrant of coplanar force system.</li> <li>2. Calculate moment of force &amp; couple and thus support reactions of statically determinate beams under different load conditions.</li> <li>3. Solve the problems of friction, its effect on ladder, horizontal plane and inclined plane.</li> <li>4. Find the centre of gravity of composite solids and centroid of composite plain figures.</li> <li>5. Find mechanical advantage, velocity ratio, efficiency of simple machines.</li> </ol>			
Pre-Requisite: Students should know			
<ol style="list-style-type: none"> <li>1. Basic Physics</li> <li>2. Geometry and Trigonometry</li> <li>3. General Mathematical manipulation</li> </ol>			
Contents:			
		Hrs/unit	Marks
Unit 1	<b>Force Systems:</b> <b>1.1 Fundamentals and Force system:</b> Definitions of Mechanics, engineering mechanics, statics, dynamics, kinetics, kinematics, rigid body, scalar and vector, force, SI unit of force, representation of force by vector and by Bow's notation method, Characteristics of a force, effect of a force, Principle of transmissibility, Classification of force system( coplanar & non coplanar), detail classification of coplanar force system (collinear, concurrent, non concurrent, parallel, like parallel & unlike parallel). <b>1.2 Resolution of a force:</b> Definition, Method of resolution, mutually perpendicular components and non – perpendicular components. <b>1.3 Moment of a Force:</b> Definition, measurement of moment of a force, SI unit of moment, physical significance of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments – Varignon's theorem and it's use. Couple- Definition, SI unit, measurement	12	15
19			

	<p>of moment of a couple, Equivalent couples- resultant of any number of coplanar couples, resolution of a given force into a force acting at a given point and a couple, properties of couple.</p> <p><b>1.4 Composition of Force:</b> Definition of resultant force, method of composition of force – <b>Analytical method</b> - parallelogram law, triangles law &amp; polygon law of force, Algebraic method for determination of resultant for concurrent, non-concurrent &amp; parallel coplanar force system. <b>Graphical method</b> - space diagram, vector diagram and funicular polygon to determine resultant for concurrent &amp; parallel force system only</p>		
<b>Unit 2</b>	<b>Equilibrium:</b>	10	15
	<p>2.1 Definition, condition of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non concurrent and parallel force system, free body and free body diagram.</p> <p>2.2 Lami's Theorem – statement &amp; explanation, Application of this theorem for solving various engineering problems.</p> <p>2.3 Definition of equilibrant, relation between resultant and equilibrant, equilibrant of concurrent &amp; non concurrent force system.</p> <p>2.4 Beams – Definition, types of beams (cantilever, simply supported, overhanging, fixed and continuous), types of end supports (simple support, hinged, roller, fixed), classification of load, reaction of a simply supported, cantilever and overhanging beam subjected to vertical point load and uniformly distributed load by analytical and graphical method.</p>		
<b>Unit 3</b>	<b>Friction:</b>	08	13
	<p>3.1 <b>Definition:</b> friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction &amp; angle of repose, cone of friction &amp; its significance, types of friction, laws of friction, advantages &amp; disadvantages of friction.</p> <p>3.2 <b>Equilibrium of bodies on horizontal and inclined plane:</b> equilibrium of body on horizontal plane subjected to horizontal and inclined force, equilibrium of body on inclined plane subjected to forces parallel to inclined plane only, Ladder friction</p>		
<b>Unit 4</b>	<b>Centroid and Centre of gravity</b>	08	12
	<p>4.1 <b>Centroid:</b> Definition of Centroid, moment of an area about an axis, Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle, quadrant of a circle. Centroid of composite figure. (No deduction for determining Centroid of basic geometrical figures)</p> <p>4.2 <b>Centre of gravity:</b> Definition of centre of gravity, centre of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube and rectangular block. Centre of gravity of composite solids. (No deduction for determining Centre of gravity of simple solids)</p>		
<b>Unit 5</b>	<b>Simple Machine:</b>	10	15
	5.1 Definition: simple machine, compound machine, load, effort,		

	<p>mechanical advantage, velocity ratio, input of a machine, output of a machine, efficiency of a machine, ideal machine, ideal load, ideal effort, machine friction, load lost in friction, effort lost in friction.</p> <p>5.2 <b>Analysis:</b> Law of machine, maximum mechanical advantage of a machine &amp; maximum efficiency of a machine, Reversibility of a machine, condition of Reversibility of a machine, self locking machine.</p> <p>5.3 <b>Study of Simple machine:</b> Calculation of mechanical advantage, velocity ratio, efficiency and identification of reversible or self locking machine of following machines: Simple Axle &amp; Wheel, Differential axle and Wheel, Weston's differential pulley block, Single Purchase crab, Double Purchase crab, Worm &amp; Worm wheel, geared pulley block, Screw Jack, Pulleys ( first, second &amp; third system of pulleys).</p>		
Total:		48( Lecture + Tutorial)	70
<b>Text Books:</b>			
Name of Author	Title of the Book	Edition	Name of the Publisher
D.S.Kumar	Engineering Mechanics		S.K. Kataria & Sons
R.S.Khurmi	Engineering Mechanics		S. Chand & Co
Basu	Engineering Mechanics		Tata McGraw Hill
R.C. Hibbeler	Engineering Mechanics		Pearson Education
S. S. Bhavikatti, K. G. Rajashekarappa	Engineering Mechanics		New Age International
Reference Books:			
R.K. Rajput	Engineering Mechanics		S.K. Kataria & Sons
Beer – Johnson	Engineering Mechanics		Tata McGraw Hill
S.Ramamruthum	Applied Mechanics		Dhanpat Rai & Sons
B. Bhattacharyya	Engineering Mechanics		Oxford University Press
NELSON	Engineering Mechanics: Statics (Schaum's Outline Series)		Tata McGraw Hill
NELSON	Engineering Mechanics: Dynamics (Schaum's Outline Series)		Tata McGraw Hill
NELSON	Engineering Mechanics : Statics & Dynamics		Tata McGraw Hill
TIMOSHENKO	Engineering Mechanics, Revised	Fourth	Tata McGraw Hill
DUBEY	Engineering Mechanics		Tata McGraw Hill
Roy Chowdhury	Engineering Mechanics		Tata McGraw Hill
Suggested List of Laboratory Experiment: <b>Nil</b> (As decided in the meeting of subject coordinators)			

Suggested list of Assignments / Tutorial:			
	<b>Group A</b>		
1.	Numerical on resolution of force / moment of force / Resultant of force System.		
2.	Numerical on Application of Lami's Theorem.		
3.	Numerical on calculation of reaction of beam subjected to point load and uniformly distributed load.		
4.	Numerical on friction force acting on body resting on horizontal surface / inclined surface and ladder friction.		
5.	Numerical on calculation of Centroid of composite figures.		
6.	Numerical on calculation of Centre of gravity of composite solids.		
7.	Numerical on calculation of M.A., VR, Efficiency, Law of Machine for simple machine.		
8.	Free body diagram of different mechanical system /2 dimensional force body.		
	<b>Group B</b>		
1.	Graphical Solution of Concurrent force system – 2 problems		
2.	Graphical Solution of parallel force system – 2 problems		
3.	Graphical Solution of Reaction of beam – 2 problems		
<b>Note:</b>			
	Total students have to be divided into 10 groups. Each group shall be allotted five different numerical from group A and three different problems from group B. problems shall be submitted by each student in separate note book. All problems have to be solved in the tutorial classes.		
Sl. No.			
1.	Examination Scheme: <b>(End semester examination)</b>		
Unit:	Marks of each question	Question to be Set	Question to be answered
1,2	10	4	2
3,4	10	3	2
5	10	2	1
1	1	6	5
2	1	6	5
3	1	4	3
4	1	3	2
5	1	6	5
		<b>Total</b>	$5*10+20*1 = 70$

## Syllabus for Technical Drawing

<b>Name of the Course:</b>		<b>TECHNICAL DRAWING</b>	
<b>Course Code:</b> ETCE,MLT,FPT,EE,CSWT,CST,DP,PHO,CHE,EIE,IT, MET, ME,MEP,CE, AE,ARCH,MIN,MS,SE,PT,LGT,And FWT.		<b>Semester:</b> First	
<b>Duration:</b> 17 weeks		<b>Maximum Marks:</b> 100	
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Theory:	2 hrs./week	Internal Examination: marks: 10	Marks on attd.: 05
Tutorial:	hrs./week	Continuous Internal Assessment: 25 External Assessment : 25	
Practical:	3 hrs./week	End Semester Exam.:	Marks : 35
<b>Credit:</b>			
<b>Aim:</b>			
Sl.No.			
1.	The Course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings.		
2.	Understand the fundamentals of Engineering Drawing		
3.	Read and interpret object drawings.		
<b>Objective:-</b> The student should be able to:-			
Sl.No.			
1.	Draw different engineering curves and know their applications.		
2.	Draw orthographic projections of different objects.		
3.	Visualize three dimensional objects and draw Isometric Projections.		
4.	Use the techniques and able to interpret the drawing in Engineering field		
5.	Use computer aided drafting		
<b>Pre-Requisite:</b>			
Sl.No.			
1.	Unambiguous and clear visualization.		
2.	Sound Pictorial Intelligence		
<b>Contents (Theory)</b>		<b>Hrs./Unit</b>	<b>Marks</b>
Unit: 1 Name of the Topics: Drawing Instruments and their uses.	1.1 Letters and numbers (Single stroke vertical 1.2 Convention of lines and their applications. 1.3 Scale ( reduced, enlarged & full size ) plain scale and diagonal scale. 1.4 Geometrical construction	<b>04</b>	<b>07</b>
Unit: 2 Name of the Topics: Engineering curves & Loci of Points.	2.1 To draw an ellipse by (a) Directrix and focus method (b) Arcs of circle method (c) Concentric circles method 2.2 To draw a parabola by (a) Directrix and focus method (b) Rectangle method 2.3 To draw a hyperbola by (a) Directrix and focus method (b) Passing through given points with reference to asymptotes 2.4 To draw involutes of circle & polygon 2.5 To draw a cycloid, epicycloid, hypocycloid 2.6 To draw Helix & spiral 2.7 Loci of points with given conditions and examples related to simple mechanism.	<b>08</b>	<b>07</b>
Unit: 3 Name of the Topics: Projection of Straight Lines and Planes	3.1 Lines inclined to one reference plane only and limited to both ends in one quadrant. 3.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal and hexagonal, inclined to one reference plane and perpendicular to the other.	<b>06</b>	<b>07</b>
Unit: 4 Name of the Topics: Orthographic projections	4.1 Introduction to Orthographic projections 4.2 Conversion of pictorial views into Orthographic views (First Angle Projection Method only) 4.3 Dimensioning technique as per SP-46	<b>06</b>	<b>07</b>

Unit: 5 Name of the Topics: Isometric projection	5.1 Isometric scale 5.2 Conversion of orthographic views into isometric views / projection (Simple objects)	<b>04</b>	<b>07</b>
Unit: 6 Name of the Topics: Introduction to CAD	6.1 To draw line, rectangle, circle, polygon with given dimensions and hatch	<b>04</b>	
<b>Total</b>		<b>32</b>	<b>35</b>
<b>Contents (Practical)</b>			
List of Practical	Intellectual skills	Motor skills	
1. <b>LETTERING , SCALE &amp; GEO.CONST.</b> Single Stroke vertical Alphabets & Numerical Plain Scale and Diagonal Scale ( reduced & enlarged ) Construction of Regular Polygons ( 1 Sheet )	To develop ability to understand Scaling and problem on geometrical constructions	To develop ability to draw Scale & geometrical constructions	
2. <b>Engineering Curves &amp; loci of points</b> Draw ellipse , parabola, hyperbola, involute, cycloid, spiral Draw locus of point on any one mechanism ( 1 Sheet )	To develop ability to differentiate between conic and curves. To develop ability to identify the type of locus from the nature of surface and the position of generating circle. Able to interpret the given mechanisms and locus of points.	To develop ability to draw different types of curves.	
3. <b>Projection of line and planes</b> Two problems on projection of lines and Two problems of planes. ( 1 Sheet )	To develop ability to differentiate between true length and apparent length. To interpret the position of lines and planes with plane	Able to draw orthographic projections of line and planes.	
4. <b>Orthographic projections</b> Four objects by first angle method ( 1 Sheet )	Develop ability to interpret first angle projection method To interpret and able to solve problem on orthographic projection of given object.	Develop ability to draw orthographic projections by first angle projection method	
5. <b>Isometric projection</b> Four objects two by true scale and another two by isometric scale ( 1 Sheet )	Develop ability to differentiate between isometric view and isometric projections. To differentiate between isometric scale and true scale	Develop ability to draw isometric views and isometric projections from given orthographic views of an object	
6. <b>Introduction to CAD</b> Draw a figure with the help of different draw and modify Command by Computer And redraw any one object of Orthographic projection.	To develop ability to handle different tools of CAD	To develop ability to draw different figure by computer.	

<b>Text Books:</b>			
Name of Authors	Titles of the Book	Edition	Name of the publisher
N.D.Bhatt	Engineering Drawing		Charotkar Publishing House
R.K.Dhawan	Engineering Drawing		S.Chand & Co.
K.Venugopal	Engineering Drawing and Graphics +AutoCAD		New Age publication
Basant Agrawal C M Agrawal	Engineering Drawing		Tata McGraw Hill Education Private Ltd.
Pal & Bhattacharya	Engineering Drawing	6th	Viva Books
<b>Reference Books:</b>			
Name of Authors	Titles of the Book	Edition	Name of the publisher
P S Gill	Engineering Drawing		SK Kataria and sons



Dhananjay A Jolhe	Engineering Drawing		Tata McGraw Hill Education Private Ltd.
Pal & Bhattacharya	Computer Aided Engineering Drawing	7th	Viva Books
<b>Suggested list of laboratory experiments:</b>			
	Not Applicable		
<b>Suggested list of Assignments/ Tutorial:</b>			
	Not Applicable		
<b>Note :</b>			
1. Student should use two separate A3 size sketch books, one for class work practice and another for assignment.			
2. Student should solve assignment on each topic.			
3. Use approximately 570mm x 380mm size Drawing sheet for sessional work.			

## Syllabus of Computer Fundamentals

<b>Name of the Course: Computer Fundamentals (For All Branches of Diploma in Engineering and Technology)</b>				
<b>Course Code:</b>		<b>Semester: First</b>		
<b>Duration:</b>		<b>Maximum Marks: 50 (Practical 25+25)</b>		
<b>Teaching Scheme</b>		<b>Examination Scheme</b>		
Theory: 1 hrs./week		Mid Semester Exam.:	Marks	
Tutorial: hrs./week		Assignment & Quiz: 25	Marks	
Practical: 3 hrs./week		End Semester Exam.:	25 Marks	
Credit: 3				
<b>Aim: To understand computer and able to work with it i.e. to operate it and familiar with Office and Internet.</b>				
Sl. No.				
1.	To Understand basics of Computer and operate it.			
2.	To Learn various application software's like MS Office or Open Office.			
3.	To understand and use of Internet and Email.			
<b>Objective: Student will be able to</b>				
Sl. No.				
1.	Understand a computer system that has hardware and software components, which controls and makes them useful.			
2.	Understand the operating system as the interface to the computer system.			
3.	Use the basic functions of an operating system.			
4.	Compare major OS like Linux and MS-Windows.			
5.	Use file mangers, word processors, spreadsheets, presentation software's and Internet.			
6.	Have hands on experience on operating system and Office package.			
7.	Use the Internet to send mail and surf the World Wide Web.			
<b>Pre-Requisite:</b>				
Sl. No.				
1.	Basic knowledge of computer is helpful.			
2.	Basic knowledge of Internet is helpful			
<b>Contents (Theory)</b>			<b>Hrs./Unit</b>	<b>Marks</b>
Unit: 1 Name of the Topics: Fundamentals of Computer	1.1 Introduction, Components of PC 1.2 The system Unit, Processor, Motherboard, Memory. 1.3 Monitor, Keyboard, Mouse, Printer, Scanner, Disk drive, Speaker, Modem, Pendrive, CD, DVD etc.		4	
Unit: 2 Name of the Topics: <b>Introduction to Windows XP/7/8.</b>	2.1 Working with window, Desktop, Components of window. 2.2 Windows Explorer, Folders, Files, Start button. 2.3 Use of Paint, Notepad, WordPad etc.		3	
Unit: 3 Name of the Topics:	3.1 Basics of Word application and its use. 3.2 Basics of Excel/Spreadsheet application and its use.		4	

<b>Use of Office or Open Office</b>	3.3 Basics of Presentation application and its use.		
Unit: 4 Name of the Topics: <b>Introduction to Internet</b>	4.1 Internet and its use, Browser, ISP, Search Engine etc. 4.2 Creating Email account, Composing and sending mails, Chatting, Downloading etc.	3	
Unit: 4 Name of the Topics: <b>Usage of Computers in Various Domains</b>	5.1 Computer application in Offices, books publication, data analysis ,accounting , investment, inventory control, graphics, Airline and railway ticket reservation, robotics	1	
<b>Total</b>		<b>15</b>	

### Contents (Practical)

Sl. No.	List of Practicals
1.	Working with Windows XP/7/8 desktop, start icon, taskbar, My Computer icon, the Recycle Bin and deleted files, Creating shortcuts on the desktop, Use of Notepad, WordPad, Paint, Calculator.
2.	The Windows Explorer, concept of drives, Switching drives, Folder creation, Moving or copying files, Renaming, Deleting files, and folders.
3.	Printing, Installation of a printer, Maintaining print queue, Handling common printer problems.
4.	Moving through a Word document menu bar and drop down menus toolbars, Entering text into a Word document, selection techniques, Deleting text, Font formatting, keyboard shortcuts, Paragraph formatting, Bullets and numbering, Page formatting, Page margins, Page size and orientation Page breaks, Headers and footers, Introducing tables and columns, Printing, Print setup, Printing options, Print preview.
5.	Development of application using mail merge, Mail merging addresses for envelopes, Printing an addressed envelope and letter, Creating and using macros in a document.
6.	Creating and opening workbooks, Navigating in the worksheet, Inserting and deleting cells, rows and column, Moving between worksheets, saving worksheet, workbook; Formatting and customizing data.
7.	Formulas, functions; Creating, manipulating & changing the chart type; Printing, Page setup, Margins; Sheet printing options, Printing a worksheet;
8.	Preparing presentations with Microsoft Power Point; Slides and presentations, Opening an existing presentation , Saving a presentation; Using the AutoContent wizard ,Starting the AutoContent wizard; Presentation type; Presentation titles, footers and slide number.
9.	Selecting a slide layout; Manipulating slide information within normal and outline view; Formatting and proofing text; Pictures and backgrounds; drawing toolbar; AutoShapes; Using clipart; Selecting objects; The format painter.
10.	Navigating through a slide show; Slide show transitions; Slide show timings; Animation effects.
11.	Internet; Connecting to the Internet; The Internet Explorer program window and other browser software; Searching the Internet; Searching the Internet using Yahoo, Google and other search engines; Favorites, security & customizing Explorer; Use of antivirus software to increase the protection of the system;
12.	Using electronic mail; Creating and sending emails; Attached files; Receiving emails; Creating a mailing group; Locating and subscribing to newsgroups; Posting a message to a newsgroup.
13.	Chatting on internet, Understating chat environment.

### Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
Vikas Gupta	Comdex Computer Course Ki	1st	Dreamtech
Henry Lucas	Information Technology for management	7th	TMH
Ramesh Bangia	Computer Fundamentals and	2nd	Laxmi Publication Pvt Ltd.

	Information Technology		
Dinesh Maidasani	Learning Computer Fundamentals, MS office ,Internet & Web Technology.	2nd	Laxmi Publication Pvt Ltd.
<b>Reference Books:</b>			
Name of Authors	Title of the Book	Edition	Name of the Publisher
Sanjay Saxsena	A First Course in Computer	2nd	Vikash Publishing House
Bangia,Arora and Jalota	Computer Software and Application	1st	Laxmi Publication Pvt Ltd.
<b>Suggested list of Laboratory Experiments:</b>			
Sl. No.	Laboratory Experiments		
1.	Installation of a printer and taking print out.		
2.	Creating a resume of your own using Word.		
3.	Creating a letter by using mail merge and taking print out of those letters.		
4.	Prepare a student mark sheet in excel.		
5.	Prepare a salary bill in excel.		
6.	Making a presentation on any topics of your subject.		
7.	Making Presentation about the College one studied.		
<b>Suggested list of Assignments / Tutorial:</b>			
Sl. No.	Topic on which tutorial is to be conducted		
1.	Draw a picture on paint brush and take print out.		
2.	Creating a resume of your own using Word.		
3.	Creating a letter by using mail merge and taking print out of those letters.		
4.	Prepare a student mark sheet in excel.		
5.	Prepare a salary bill in excel.		
<b>Note:</b>			
Sl. No.			
1.	Internal marks will be given mainly on the basis on Laboratory work and assignment given. Student should prepare a Note Book on the assignment or work done. Student can work with any version of Windows/Linux, MS Office or Open Office software.		

## Syllabus for : Workshop Practice

<b>Name of the Course: Diploma in Mechanical/ Electrical/ Electronics/ Electronics &amp; Instrumentation/ Civil/ Computer/ Chemical Engg. Groups/Mechanical (Production)/Automobile/Computer Software/Footwear/Leather Goods/Food Processing/Packaging/Medical Lab. Tech/Mine Survey/ Mining/ Metallurgical Engg. &amp; Technology.</b>					
<b>Course Code:</b>	<b>Semester: First &amp; Second</b> (At least One Unit should be completed in 1 <sup>st</sup> semester and rest two from 2 <sup>nd</sup> semester. Evaluation may be done by continuous assessment process and by External Examiner in end semester.)				
<b>Duration:</b> : Seventeen weeks/Semester	<b>Maximum Marks: 200 (1<sup>st</sup> + 2<sup>nd</sup>)</b>				
<b>Teaching Scheme</b>	<b>Examination Scheme: Continuous Evaluation</b>				
Theory: Nil hrs./week	Mid Semester Exam.: Nil				
Tutorial: Nil hrs./week	Attendance & Teacher's Assessment 100 Marks(1 <sup>st</sup> + 2 <sup>nd</sup> )				
Practical: 3 hrs./week	End Semester Exam.:100Marks(1 <sup>st</sup> + 2 <sup>nd</sup> )				
Credit: 3					
<b>Aim: To impart practical knowledge in Work Shop related with course of study.</b>					
<b>Objective:</b> Student will able to					
Sl. No.					
1.	Know basic Work Shop Processes.				
2.	Read and interpret job drawings.				
3.	Identify, select, & use of various marking, measuring, holding, striking & cutting tools & equipments.				
4.	Operate, control different machines & equipments.				
5.	Inspect the job for specified dimensions.				
6.	Produce jobs as per specified dimensions.				
7.	Adopt safety practices (tools, jobs& personal) while working on various machines.				
8.	Acquaint with the chronological operational processes involving in the jobs.				
9.	Care & maintenance of the tools & machines.				
<b>Pre-Requisite: Nil</b>					
Sl. No.					
1.					
2.					
<b>Contents :</b>		<b>GROUP: A/B/C</b>	<b>TOTAL PERIODS: 90 (30 Weeks) + 12 (4 Weeks) = 102 (34 Weeks)</b>	Hrs./Unit	Mark s
<b>Unit: 1 is compulsory and any two units from the rest as deemed fit for the branches.</b>					
Unit: 1	<b>Electrical Shop (Compulsory)</b> <b>1. General Shop Talk</b> 1.1 General safety & precautions taken in Electrical Workshop 1.2 Electric shock, methods of shock treatment 1.3 Fuse and safety measure			6 periods	

	<p>1.4 Earthing as safety measure — I.E. Rule – 61 — Different types of Earthing</p> <p>1.5 Different types of wire-gauge &amp; strands, applications</p> <p>1.6 Different tools used Electrical wiring installations — Applications</p> <p>1.7 General wiring accessories &amp; their uses.</p> <p>1.8 Types of wiring &amp; their comparison.</p> <p><b>2.0 PRACTICES</b></p> <p>2.1 Study of Single Phase service connection from Pole to house ( Equipments required : Service Pole, Energy Meter, Service Fuse, Distribution Board, Earth Wire) &amp; Complete connection of Consumer Installation.</p> <p>2.2 To make Straight &amp; 'T' Joint of 7/20 PVC wire.</p> <p>2.3 Wiring practice in Casing / Conduit Wiring (PVC Conduit) ( one light, one fan ,one plug point &amp; One lamp controlled by Two- Way switches including connection of Single phase Energy Meter &amp; Main Switch).</p> <p>2.4 Wiring of Calling-Bell ( on T.W. batten/ PVC conduit / PVC casing).</p> <p>2.5 Connection of Twin-Fluorescent Tube (AC/DC) .</p> <p>2.6 Practice of Soldering &amp; De soldering Techniques).</p> <p>2.7 Identification of Basic Electronics components using Multimeter.</p> <p>* N.B. ITEM 2.1 &amp; 2.3 ARE COMPULSORY AND THE STUDENTS ARE TO UNDERGO ANY 3 OUT OF THE REST 5 PRACTICES.</p>	24 periods	
Unit: 2	<p><b>Carpentry</b></p> <p><b>1.0 GENERAL SHOP TALK</b></p> <p>1.1 Name and use of raw materials used in carpentry shop: wood &amp; alternative materials</p> <p>1.2 Names, uses, care and maintenance of hand tools such as different types of Saws, 'G'- Clamp Chisels, Mallets, Carpenter's vices, Marking gauges, Try-squares, Rulers and other commonly used tools and materials used in carpentry shop by segregating as cutting tools, supporting tools, holding tools , measuring tools etc.</p> <p>1.3 Specification of tools used in carpentry shop.</p> <p>1.4 Different types of Timbers , their properties, uses &amp; defects.</p> <p>1.5 Seasoning of wood.</p> <p>1.6 Estimation.</p> <p><b>2.0 PRACTICES</b></p>	6 PERIODS	

	<p>2.1 PRACTICES FOR BASIC CARPENTRY WORK</p> <ul style="list-style-type: none"> <li>(a) Sawing practice using different types of saws</li> <li>(b) Assembling jack plane — Planning practice including sharpening of jack plane cutter</li> <li>(c) Chiselling practice using different types of chisels including sharpening of chisel</li> <li>(d) Making of different types of wooden pin &amp; Fixing methods.</li> <li>(e) Marking, measuring and inspection of jobs.</li> </ul> <p>2.2 PREPARATION OF JOINTS IN A SINGLE PIECE OF JOB (ANY ONE )</p> <ul style="list-style-type: none"> <li>(a) Half-lap joint ("I" Cross or "L" or 'T').</li> <li>(b) Mortise &amp; Tenon Joint (including drilling and fixing using wooden pins) — T-joint</li> <li>(c) Dovetail joint (Lap &amp; Bridle Dovetail)</li> </ul> <p>2.3 PRACTICE ON WOOD WORKING LATHE</p> <ul style="list-style-type: none"> <li>(a) Safety precaution on Wood working machines.</li> <li>(b) Study of wood working lathe; (c) Sharpening of lathe tools; (d) Setting of jobs and tools;</li> <li>(e) Different type of wood turning practice</li> </ul> <p>2.4 * PRODUCTION OF UTILITY ARTICLES (GROUP WORK)</p> <ul style="list-style-type: none"> <li>(a) Making Handles of chisels / files /screw drivers etc.</li> <li>(b) Making Legs of cabinets: Straight, Tapered and Ornamental</li> </ul> <p>2.5 Study on and practice of the following machines:  (a) Surface Planer (b) Band Saw (c) Circular Saw</p> <p>* May be done in group work if possible</p>	<b>24 PERIODS</b>	
<b>Unit: 3</b>	<p style="text-align: center;"><b>SMITHY/ FORGING SHOP</b></p> <p><b>1. GENERAL SHOP TALK</b></p>	<b>6 PERIODS</b>	

	<p>1.1 Purpose of Smithy / Forging Shop</p> <p>1.2 Different types of Hearths used in Smithy / Forging shop</p> <p>1.3 Purpose specifications uses, care and maintenance of various tools and equipments used in hand forging by segregating as cutting tools, supporting tools, holding tools, measuring tools etc.</p> <p>1.4 Types of fuel used and maximum temperature obtained</p> <p>1.5 Types of raw materials used in Smithy / Forging shop</p> <p>1.6 Uses of Fire Bricks &amp; Clays in Forging Work Shop.</p> <p><b>2. PRACTICES</b></p> <p>2.1 Practice of firing of hearth / Furnace, Cleaning of Clinkers and Temperature Control of Fire.</p> <p>2.2 Practice on different basic Smithy / Forging operations such as Cutting, Upsetting, Drawing down, Setting down, Necking, Bending, Fullering, Swaging, Punching and Drifting</p> <p>(A) <u>Demonstration</u> — Making cube, hexagonal cube, hexagonal bar from round bar</p> <p>(B) <u>Job Preparation (Any one)</u></p> <p>Job 1 Making a cold / hot, hexagonal / octagonal flat chisel including tempering of edges</p> <p>Job 2 Making a chain-link or Door Ring by bending and forge-welding</p> <p>Job 3 Production of utility goods e.g. hexagonal bolt / square shank boring tool, fan hook (long S-type) [Two jobs are to be done by the students]</p> <p><b>2.3 Practice of Simple Heat treatment processes like Tempering, Normalizing Hardening etc.</b></p>	<p><b>24 PERIODS</b></p>	
<p><b>Unit: 4</b></p>	<p><b>WELDING SHOP</b></p> <p><b>1. GENERAL SHOP TALK</b></p> <p>1.1 Purpose of Welding, Brazing and Soldering.</p> <p>1.2 Purpose, specifications, uses, care and maintenance of various Welding machines, Cables, tools and equipments used for welding, brazing and soldering (soft and hard)</p> <p>1.3 Purpose of fluxes, electrodes, filler rods</p> <p>1.4 Safety equipments used in Welding Shop</p>	<p><b>6 Periods</b></p>	



	<p>1.5 Various method of Welding (Fusion and Resistance ) and its use.</p> <p>1.6 Selection of Electrods</p> <p><b>2.0 PRACTICES</b></p> <p>2.1 Study of Welding Transformers and Generators used in Arc-Welding</p> <p>2.2 Demonstration of Gas-Cutting and Gas-Welding processes</p> <p>2.3 Practice of Edge Preparation, Simple run, Tag Welding on arc-welding.</p> <p>2.4 PRACTICE OF WELDING: (a) Lap welding, (b) Different methods of Butt Welding (c) T' Fillet &amp; Groove Welding, (d) Edge &amp; Corner Welding in different position like Down hand Flat, Horizontal and Vertical (e) Stress relieving method.</p> <p>(A) <u>Job Preparation (Any One)</u></p> <p>JOB - 1 JOINING of M.S. plates — Two jobs on Lap-Joint and Butt-Joint (single/double plates), thickness of plates varying from 6 mm to 12 mm with proper edge preparation</p> <p>JOB - 2 SPOT-WELDING on M.S. /G.I. Sheets</p> <p>JOB - 3 SOLDERING: use of soft / hard solders and brazing on dissimilar materials</p> <p>JOB - 4 Study of TIG / MIG welding sets</p> <p>(B) <u>Testing</u></p> <p>Defects in welding and testing of welding joints by Dry Penetration method &amp; by Mechanical Method.</p> <hr style="width: 10%; margin: 10px auto;"/>	<b>24 PERIODS</b>	
<b>Unit: 5</b>	<p><b>BENCH WORK &amp; FITTING SHOP</b></p> <p><b>1. GENERAL SHOP TALK</b></p> <p>Purpose of Bench Work and Fitting Shop:</p> <p>(a) Study of different types of hand tools &amp; their uses, care and maintenance of tools e.g. Files, Chisels, Hammers, Hack-saw with frames, Fitting Bench Vice, Different other Vices, Divider, Try-square, Drill-taps, Dies, V-blocks, Bevel protector, Scribes, Surface plates, Types of Callipers Types of Drill bits etc.</p> <p>(b) Study of measuring instruments by direct and indirect methods: Micrometer – Vernier callipers – Bevel protectors – Steel Rule.</p> <p>(c) Dismantling &amp; Assembling of Fitting Bench Vice.</p>	<b>6 PERIODS</b>	
		<b>24 PERIODS</b>	

	<p>(d) Study of Drilling Machine.</p> <p><b>2.0 BASIC FITTING SHOP PRACTICES*</b></p> <p>2.1 Chipping and chiselling practice  2.2 Filing practice  2.3 Marking and measuring practice  2.4 Drilling and tapping practice  2.5 Making Stud Bolt by Die.  2.6 Making Male- Female Joint.</p> <p>* N.B. AT LEAST ONE JOB COVERING THE ABOVE MENTIONED ARE TO BE PREPARED INCLUDING PROCESSES.</p>		
<b>Unit: 6</b>	<p><b>MACHINE SHOP</b></p> <p><b>1. SHOP TALK ON MACHINE SHOP</b></p> <p>1.1 Safety Precautions.  1.2 Demonstration of drilling machine, Lathe machine, Shaping, Slotting machine.  1.3 Demonstration of drill bits, Single Point &amp; Multi point Cutting tools</p> <p><b>2. PRACTICE ON MACHINE SHOP</b></p> <p>2.1 Use of Drill Machine and drilling practice  2.2 Preparation of one job in Lathe machine involving the operation like Plane Turning, Step Turning, Grooving, Chamfering, Knurling etc.</p>	<b>6 PERIODS</b>	
<b>Unit :7</b>	<p><b>ELCTRONICS WORKSHOP</b></p> <p><b>1. SHOP THEORY</b></p> <p>1.1 Common Assembly tools.  1.2 Identification of Basic Components; both active &amp; passive  1.3 Use of Multimeter (both Analog and digital).  1.4 Rules for soldering &amp; de-soldering.  1.5 Rules of component mounting and harnessing.  1.6 Artwork Materials in PCB design, General artwork rules, taping guidelines.</p> <p><b>2. PRACTICES</b></p> <p>2.1 Identification of basic components: Passive-resistors, Capacitors, Inductors/Coils, Transformers, relays, switches, connectors;</p>	<b>6 PERIODS</b>	

	<p>Active- Batteries/cells, diode, transistors (BJT, FET) SCR, diac, Triac, LED, LCD, Photo-diode, Photo-transistors.</p> <p>2.2 Use of Multimeters to test components and measurement of circuits, Voltage, resistance etc.</p> <p>2.3 Soldering and de-soldering practice</p> <p>2.4 Component mounting practice</p> <p>2.5 Wire harnessing practice</p> <p>2.6 General artwork practice on graph sheets and taping practice on mylar sheet.</p> <p style="text-align: center;">—————</p>		
<p><b>Unit :8</b></p>	<p style="text-align: center;"><b>COMPUTER WORKSHOP</b></p> <p style="text-align: center;"><b>1. SHOP THEORY</b></p> <p>1.1 Different types of Key Boards.</p> <p>1.2 Different types of Mouse.</p> <p>1.3 Different types of Scanners.</p> <p>1.4 Different types of Modems.</p> <p>1.5 Different types of Printers.</p> <p>1.6 Different types of CD Writers, Speakers, CD Read/ Write Drive.</p> <p>1.7 Different types of Microphones, LCD Projectors, Pen Drive, DVD Drives.</p> <p>1.8 Different types of Monitors.</p> <p>1.9 Different makes of Hard Disks.</p> <p>1.10 Different types of Net Work Interface Cards.</p> <p>1.11 Different types of Cables Such as Data Cables, Printers Cables Net Work Cables, Power Cables etc.</p> <p>1.12 Different types of Floppy Disk.</p> <p>1.13 Mother Board connection.</p> <p>1.14 Graphics Card connection.</p> <p>1.15 Net Work Interface card connection.</p> <p style="text-align: center;"><b>2. PRACTICES</b></p> <p>2.1 Connection of Mouse in different ports.</p> <p>2.2 Connection of Key Boards in different ports.</p> <p>2.3 Connection of Monitors.</p> <p>2.4 Connection of Printers.</p> <p>2.5 Different Switch settings of Printers.</p> <p>2.6 Printer's self test.</p> <p>2.7 Jumper setting of Hard Disks.</p> <p>2.8 Attaching FDD, HDD and CD Drives.</p> <p>2.9 Attaching Pen Drives and DVDs.</p>	<p><b>6 PERIODS</b></p> <p><b>24 PERIODS</b></p>	

	2.10 Attaching Scanner.		
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<b>Text Books:</b>			
Name of Authors	Title of the Book	Edition	Name of the Publisher
S. K. Hazra Chaudhury	Work Shop Technology	Volume I &II Latest	Media promoters, Mumbai
Raghuwanshi	Work Shop Technology	Volume I &II Latest	Dhanpath Rai & Sons
Gupta	Production Technology		Sayta Prakasani
Bawa	Manufacturing Processes		Tata McGraw-Hill
Ali Hasan & R. A. Khan	Manufacturing Processes		Scitech Pub.Chennai