



**Government Polytechnic, Mumbai**

*Department of Civil Engineering*

**P-19 Curriculum  
(Sandwich Pattern)**

**Semester-I  
(Course Contents)**

**GOVERNMENT POLYTECHNIC MUMBAI**  
(Academically Autonomously Institute, Government of Maharashtra)  
**Teaching and Examination Scheme (P19)**  
**With effect from AY 2019-20**

**Programme: Diploma in Civil Engineering (Sandwich Pattern)**

**(Term / Semester – I)**

Course Code	Course Title	Teaching Hours/Contact Hours				Credits	Examination Scheme (Marks)						
		L	P	TU	Total		Theory			PR	OR	TW	Total
							TH	TS1	TS2				
SC19107	Engineering Chemistry	3	2	--	5	5	60	20	20	25*	--	25	150
SC19109	Basic Mathematics	4	--	--	4	4	60	20	20	--	--		100
HU19101	Communication Skill	2	2	--	4	4	60	20	20	25*	--	25	150
ME19201	Engineering Drawing I	2	4	--	6	6	--	--	--	50*	--	50	100
WS19201	Workshop Practice	--	4	--	4	4	--	--	--	--	--	50	50
CE19101	Construction Materials	3	--	--	3	3	60	20	20	--	--	--	100
CE19102	Libre Office Calc on BOSS Linux (9) (Spoken Tutorials)	--	4 <sup>#</sup>	--	4	4 <sup>#</sup>	--	--	--	--	--	--	--
	<b>Total</b>	<b>14</b>	<b>16</b>	<b>--</b>	<b>30</b>	<b>30</b>	<b>240</b>	<b>80</b>	<b>80</b>	<b>100</b>	<b>--</b>	<b>150</b>	<b>650</b>
Student Centered Activity(SCA)					<b>05</b>								
Total Contact Hours					<b>35</b>								

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment)

\* Indicates assessment by External Examiner else internal assessment, #indicates Self, on- line learning Mode, @ indicates on line examination

Note: Duration of Examination--TS1&TS2 -1 hour , TH- 2 hours 30 minutes, PR/OR – 3 hours per batch , SCA- Library -1 hour, Sports- 2hours, Creative Activity-2 hours  
Self, on- line learning Mode through MOOCS/Spoken Tutorials /NPTEL/SWAYAM/FOSSEE etc.

Coordinator,  
Curriculum Development,  
Department of Civil Engineering

In-Charge  
Curriculum Development Cell

Head of Departments  
Department of Civil Engineering

Principal

Programme : <b>Diploma in CE/ME( Sandwich Pattern)</b>										
Course Code: <b>SC19107</b>				Course Title: <b>Engineering Chemistry</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2.30 Hrs.)	TS1 (1 Hr.)	TS2 (1Hr)	PR	OR	TW	Total
<b>3</b>	<b>2</b>	<b>--</b>	<b>5</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>25*</b>	<b>--</b>	<b>25</b>	<b>150</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

**Note:** For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term.

### Rationale:

The subject is included under category of basic sciences. The role is to understand the fundamental concepts and facts about infrastructure of physical matters and their interrelationship. This will provide input for better understanding of other foundation and technology subjects

**Course Outcomes:** Student should be able to

CO1	Apply the principles of chemistry under different engineering situations.
CO2	Apply various applications of electrolysis in engineering field.
CO3	Illustrate various methods of softening of hard water
CO4	Adopt methods of prevention of corrosion for environmental and safety concerns.
CO5	Select suitable Lubricants, material for a particular use effectively.

**Course Content Details:**

Unit No	Topics / Sub-topics
1	<p><b>Atomic Structure</b></p> <p>1.1 Introduction of atom, Molecules, Fundamental Particles, Proton, Neutron, Electron. their mass, charge, location. And symbol Bohr's theory, Postulates, Structure of modern atom.</p> <p>1.2 Atomic number and atomic mass number. Atomic weight Numerical based on atomic number &amp; atomic mass number</p> <p>1.3 Rules governing filling up of atomic orbitals, Quantum no. Pauli's Exclusion Principle, Aufbau's Principle, Hund's rule. Electronic configuration of atoms up to atomic number 30</p> <p>1.4 Valence and chemical bonding. Valence: Definition, &amp; examples. Types of valence :Electrovalence &amp; Co-valence</p> <p>1.5 Electrovalent bond: Definition, Formation. Formation of NaCl</p> <p>1.6 Co-valent bond : Definition &amp; formation Formation of following molecules Single bond:, Chlorine. Double bond : Oxygen,, Triple Bond : Nitrogen,,</p> <p>1.7 Distinction between electrovalent and covalent compound.</p> <p><b>Course Outcome: CO1 Teaching Hours : 8 hrs Marks: 10 (R- 2, U-4, A-4)</b></p>
2	<p><b>Electrochemistry</b></p> <p>2.1 Definition of Electrochemistry, Electrolytes: Definition, Types. Differences between Atom and ion. Definition of ionization &amp; electrolytic dissociation, Arrhenius theory, Degree of ionization with factors affecting it.</p> <p>2.2 Terms related to Electrolysis Mechanism of electrolysis. Examples of: mechanism of Electrolysis of <math>\text{CuSO}_4</math> by using Cu electrodes.</p> <p>2.3 Faradays First law and its mathematical derivation. Faradays second law &amp; its mathematical derivation, Numerical based on laws of Faraday.</p> <p>2.4 Application of Electrolysis: Electroplating.</p> <p><b>Course Outcome: CO2 Teaching Hours : 8 hrs Marks: 10 (R- 4 , U-4 , A-2 )</b></p>
3	<p><b>Water</b></p> <p>3.1 Sources of water, impurities present in water.(suspended, dissolved, colloidal, biological) Types of water: hard &amp; soft Causes of hardness of water Types of Hardness, Unit of hardness, Definition of hardness.</p> <p>3.2 Bad effects of Hard Water for Domestic purposes.&amp; Industrial purposes (Textile ,Dyeing, Sugar industry, Bakery)</p> <p>3.3 Bad effects of hard water in Boiler, Scales and Sludge's, causes of their formation, their disadvantages and their removal.</p> <p>3.4 Treatment of hard water for industrial purposes by Zeolite &amp; Ion Exchange process</p> <p>3.5 Treatment of hard water for drinking purposes.(city water supply)</p> <p><u>Various steps:</u> Screening, Sedimentation, Coagulation, Filtration, Sterilization by boiling.</p> <p>3.6 pH value: Definition, Formula, pH scale, its salient features, Numerical based on pH, Applications of pH related to Engg .field (corrosion of bridges, Electroplating,).</p>

	<p><b>Course Outcome: CO3 Teaching Hours : 8 hrs Marks: 10 (R-2 , U-4 , A-4)</b></p>
4	<p><b>Corrosion</b></p> <p>4.1 Definition of corrosion. Types of corrosion. Atmospheric &amp; Electrochemical Corrosion.</p> <p>4.2 Mechanism of atmospheric corrosion, types of oxide films formed, (stable, unstable, volatile, with examples)</p> <p>4.3 Electrochemical corrosion/immersed corrosion Definition. Example. Factors Affecting, Atmospheric &amp; Electrochemical Corrosion.</p> <p>4.4 Protection of metals from Corrosion:- By protective coatings a) organic coating (Paints and Varnishes), b) inorganic coating (Metallic Coating)</p> <p>4.5 Different methods of Protective metallic coatings. A) Hot dipping (Galvanizing &amp; Tinning) b) Sherardizing c) Metal Spraying</p> <p><b>Course Outcome: CO4 Teaching Hours :8 hrs Marks: 10 (R-2, U-4 , A-4 )</b></p>
5	<p><b>Lubricants</b></p> <p>.1 Definition of lubricant, example, functions of lubricant, classification of lubricants (solid, semi-solid and liquid) examples. Conditions under which each lubricant is used.</p> <p>5.2 Lubrication: definition and types conditions under which each lubricant is used. Types of lubrications, Fluid film, Boundary, Extreme pressure lubrication. Definition, diagram &amp; description of each type.</p> <p>5.3 Characteristic of good lubricant A) Physical Characteristics</p> <ul style="list-style-type: none"> <li>• Viscosity</li> <li>• Viscosity index</li> <li>• Oiliness</li> <li>• Volatility</li> <li>• Flash point &amp; Fire Point</li> <li>• Cloud and Pour point</li> </ul> <p>B) Chemical Characteristics</p> <ul style="list-style-type: none"> <li>• Acidity /Neutralization no.</li> <li>• Emulsification</li> </ul> <p>Saponification value</p> <p><b>Course Outcome: CO5 Teaching Hours : 6 Marks: 10 (R-4 , U-4 , A-2 )</b></p>
6	<p><b>Nonmetallic Engineering Material</b></p> <p>6.1 Definition of nonmetallic engineering materials</p> <p><b>6.2 Plastic :</b> definition , example Polymerization : definition ,Types of Polymerization addition and condensation Addition polymerization : definition formation of polyethylene , Condensation-polymerization : definition Formation Of nylon-66 Types of plastic: thermo softening, thermo setting plastics, Differences between them. Compounding of plastic , Materials needed for it (pigments, fillers, Plasticizers</p>

	<p>Accelerators etc.,) Properties and engineering applications of plastic.</p> <p><b>6.3 Rubber:</b>  definition of rubber (elastomer) Natural rubber : Basic unit in natural rubber(isoprene)  Occurrence &amp; Processing of Latex .Drawbacks of natural Rubber, Vulcanization Of rubber: I  Chemical reactions, ,Types of Rubber Synthetic rubber Importance ,difference , Example Bu  rubber, Thiokol, Neoprene  Properties of rubber: Elasticity, Tack, Rebound ,Abrasion resistance Applications of rubber</p> <p><b>6.4 Thermal insulating materials</b>  Definition, Examples Thermocole, Glass wool. <b>Thermocole:</b> Definition, Preparation,  Properties &amp; uses, <b>Glass wool:</b> Definition, Preparation, Properties &amp; uses</p> <p><b>Course Outcome: CO5 Teaching Hours : 7 hrs Marks: 10 (R- 2 , U- 6 , A- 2 )</b></p>
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**Suggested Specifications Table (Theory):**

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Atomic Structure	02	04	04	10
2	Electrochemistry	04	04	02	10
3	Water	02	04	04	10
4	Corrosion	02	04	04	10
5	Lubricants	04	04	02	10
6	Nonmetallic Engineering Materials	02	06	02	10
<b>Total</b>		<b>16</b>	<b>26</b>	<b>18</b>	<b>60</b>

**List of experiments:**

Sr. No.	Unit No	CO	List of Experiments	Hours
1	1	CO1	Introduction of chemistry laboratory & safety measures.	2
2	2	CO2	Determination of conductivity of different electrolytes by using conductivity meter.	2
3	3	CO3	Estimation of Chloride content from given water sample	2
4	4	CO4	Estimation of percentage purity of iron from the given alloy sample	2
5	5	CO5	To find out acid value of given lubricant	2
6	1	CO1	Basic radicals : $\text{Cu}^{++}$ , $\text{Fe}^{++}$ , $\text{Fe}^{+++}$ , $\text{Cr}^{+++}$ , $\text{Mn}^{++}$ , $\text{Ni}^{++}$ , $\text{Zn}^{++}$ , $\text{Ca}^{++}$ , $\text{Ba}^{++}$ , $\text{Mg}^{++}$ , $\text{NH}_4^+$ Acidic Radicals: $\text{Cl}^-$ , $\text{Br}^-$ , $\text{I}^-$ , $\text{CO}_3^{--}$ , $\text{SO}_4^{--}$ , $\text{NO}_3^-$	6
7	2	CO2	Determination of electrochemical equivalent of copper by using cu -electrodes	2
8	3	CO3	Find out the total hardness from given sample of water by EDTA method	2
9	4	CO4	To Study Corrosion of Aluminum rod in acidic and basic medium and plot a graph of rate of corrosion.	2
10	5	CO5	Determination of coefficient of viscosity of given oil ( Glycerin) by using Ostwald's Viscometer	2
11	3	CO3	To find out pH of different solutions using Lovibond comparator, pH paper, pH meter.	2
12	4	CO4	Estimation of moisture content in given coal sample	2
13	6	CO5	Preparation of phenol formaldehyde / Bakelite plastic	2
			<b>Total</b>	<b>30</b>

**Note: Experiments No. 1 to 10 are compulsory and should map all units and Cos. Remaining experiments are to be perform on the basis of availability of time.**

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Engineering Chemistry	M.M. Uppal, Khanna Publisher, Delhi	978-81-7409-262-5
2	Polytechnic Chemistry	V.P. Mehta, Jain Brothers, Delhi	978-81-8360-093-X
3	Applied Chemistry	P.C. Jain, Monica Jain, Dhanpat Rai and Sons , Delhi	13: 9788187433170
4	Chemistry in Engineering and technology Volume 1 and 2	J.C. Kurlacose, J. Jairam Tata Mcgraw hill.	9780074517352

**E-References:**

1. [www.chemistry.org](http://www.chemistry.org)
2. [www.chemistryclassroom.com](http://www.chemistryclassroom.com)
3. [www.youtube/chemistry](http://www.youtube/chemistry)
4. [www.ferrofchemistry.com](http://www.ferrofchemistry.com)
5. <http://hperchemistry.phastr.gsu.edu/hbase/hph.htm>
6. [www.sciencejoywagon.com/](http://www.sciencejoywagon.com/)
7. <https://www.vedantu.com/ncert-solutions/ncert-solutions-class-12-chemistry>

**CO Vs PO and CO Vs PSO Mapping (CIVIL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	1	2	2	1	1		1	
CO2	3	2	1	2	2	2	1			
CO3	3	2	1	1	2	2	1		1	
CO4	3	2	1	2	2	2	1		1	
CO5	3	2	1	2	2	2	1			1

**CO Vs PO and CO Vs PSO Mapping (MECHANICAL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	2	2	1	1	1	1
CO2	3	2	1	2	2	2	1	1	1
CO3	3	2	1	1	2	2	1	1	2
CO4	3	2	1	2	2	2	1	2	2



CO5	3	2	1	2	2	2	1	2	2
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**Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organisation
1	Neelankumar R. Sawant	State Head Technical Services for (Maharashtra and Goa)	JSW Cement Ltd. Mumbai Head Office
2	Mrs Vaishali Gokhale	Lecturer in Chemistry	Government Polytechnic Pune
3	Dr. Mrs. Smita Petkar Dhopate	Lecturer in Chemistry	Government Polytechnic Nagpur
4	Mrs J. V. Iyengar	Lecturer in Chemistry	Government Polytechnic Mumbai
5	Mrs S.M. Patil	Lecturer in Chemistry	Government Polytechnic Mumbai

Coordinator,  
Curriculum Development,  
Department of Sci. & Humanities

Head of Departments  
Department of Sci. & Humanities

I/C, Curriculum Development Cell

Principal

Programme : <b>Diploma in CE/ME/IT/CO/EC/IS/EE(Sandwich Pattern)</b>										
Course Code: <b>SC19109</b>				Course Title: <b>BASIC MATHEMATICS</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs. 30 Min.)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>04</b>	-	-	<b>04</b>	<b>60</b>	<b>20</b>	<b>20</b>	-	-	-	<b>100</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term

#### Rationale:

This subject is kept under the branch of sciences. This subject intends to teach student basic facts ,concepts, principles, and procedure of mathematics as a tool to analyze engineering problems and as such lays down foundation for understanding the engineering and core technology subject.

**Course Outcomes:** Student should be able to

<b>CO1</b>	Identify the basic principles of mathematics about the field analysis of any engineering problem.
<b>CO2</b>	Apply rules ,concept and properties to solve the basic problems.
<b>CO3</b>	Establish relation between two variables.

## Course Content Details:

Unit No	Topics / Sub-topics
1	<p><b>1.Trigonometry:</b></p> <p>1.1 Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), Sub multiple angles</p> <p>1.2 Factorization and De-factorization Formulae</p> <p>1.3 Inverse Circular function (definition and simple problems).</p> <p><b>Course Outcome: CO1 Teaching Hours : 10 hrs Marks: 10 (R- 4, U-4, A-2)</b></p>
2	<p><b>2.Vectors:</b></p> <p>2.1 Definition of vector , position vector</p> <p>2.2 Algebra of vectors(Equality, addition ,subtraction and scalar multiplication)</p> <p>2.3 Dot (Scalar) product &amp; Vector (Cross) product with properties.</p> <p><b>Course Outcome: CO3 Teaching Hours : 10 hrs Marks: 10 (R- 2 , U-4 , A-4 )</b></p>
3	<p><b>3.Logarithms:</b></p> <p>3.1 Definition of logarithm</p> <p>3.2 Laws of logarithm</p> <p>3.3 simple examples based on laws.</p> <p><b>Course Outcome: CO2 Teaching Hours : 10hrs Marks:10 (R-4 , U- 4 , A-2 )</b></p>
4	<p><b>4.Probability :</b></p> <p>4.1 Definition of random experiment , sample space, event, occurrence of event and types of event ( Impossible , mutually exclusive , exhaustive ,equally likely )</p> <p>4.2 Definition of Probability</p> <p>4.3 Addition &amp; Multiplication Theorems of probability without proof , simple examples</p> <p><b>Course Outcome: CO1 Teaching Hours :10hrs Marks:10 (R-4, U- 4 , A-2 )</b></p>
5	<p><b>5.Determinants:-</b></p> <p>5.1 Definition of Determinant</p> <p>5.2 Expansion of Determinant of order 2X3</p> <p>5.3 Crammer's rule to solve simultaneous equations in 3 unknowns</p> <p><b>Course Outcome: CO2 Teaching Hours :10 hrs Marks:10 (R- 2 , U-4 , A-4 )</b></p>
6	<p><b>6.Matrices:</b></p> <p>6.1 Definition of a matrix of order m x n</p> <p>6.2 Types of matrices</p> <p>6.3 Algebra of matrices - equality, addition,subtraction ,multiplication &amp; scalar multiplication.</p> <p>6.4 Transpose of matrix.</p> <p>6.5 Minor , co-factor of an element.</p> <p>6.6 Adjoint &amp; inverse of a matrix by adjoint method.</p> <p>6.7 Solution of a simultaneous equations by matrix inversion method.</p> <p><b>Course Outcome: CO3 Teaching Hours : 10 hrs Marks: 10 (R- 2 , U- 4 , A- 4 )</b></p>

**Suggested Specifications Table (Theory):**

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	<b>Trigonometry</b>	04	04	02	10
2	<b>Vectors</b>	02	04	04	10
3	<b>Logarithms</b>	04	04	02	10
4	<b>Probability</b>	04	04	02	10
5	<b>Determinants</b>	02	04	04	10
6	<b>Matrices</b>	02	04	04	10
<b>Total</b>		<b>18</b>	<b>24</b>	<b>18</b>	<b>60</b>

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Mathematics for Polytechnic Students	S.P.Deshpande, Pune Vidyavardhini Graha Prakashan	-
2	Mathematics for Polytechnic Students ( Volume I )	H.K.Dass, S.Chand Prakashan	9788121935241
3	Companions to Basic Maths	G.V.Kumbhojkar, Phadke Prakashan	10-B07951HJDQ 13-B07951HJDQ
4	Applied Mathematics	N.Raghvendra Bhatt late, Tata McGraw Hill Publication Shri R Mohan Singh	9789339219567, 9339219562

**E-References:**

1. [www.math-magic.com](http://www.math-magic.com)
2. [www.Scilab.org/-SCI](http://www.Scilab.org/-SCI) Lab
3. [www.mathworks.com/Products/Matlab/-MATLAB](http://www.mathworks.com/Products/Matlab/-MATLAB)
4. [www.wolfram.com/mathematica/-Mathematica](http://www.wolfram.com/mathematica/-Mathematica)
5. <https://www.khanaacademy.org/math?gclid=CNqHuabCys4CFdoJaAoddHoPig>
6. [www.dplot.com/-Dplot](http://www.dplot.com/-Dplot)
7. [www.allmathcad.com/-Math CAD](http://www.allmathcad.com/-Math CAD)
8. [www.easycalculation.com](http://www.easycalculation.com)
9. <https://www.vedantu.com/ncert-solutions/ncert-solutions-class-12-maths>
10. MYCBSEGUIDE

**CO Vs PO and CO Vs PSO Mapping (CIVIL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		1
CO2	3	2					1	1		1
CO3	3			2			1	1		1

**CO Vs PO and CO Vs PSO Mapping (MECHANICAL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3			2			1	1	
CO2	3	2					1	1	
CO3	3			2			1	1	

**CO Vs PO and CO Vs PSO Mapping (COMPUTER ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		
CO2	3	2					1	1		
CO3	3			2			1	1		

**CO Vs PO and CO Vs PSO Mapping (INFORMATION TECHNOLOGY)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1	1		1
CO2	3	2					1	1		1
CO3	3			2			1	1		1

**CO Vs PO and CO Vs PSO Mapping (ELECTRONICS ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1		1	1
CO2	3	2					1		1	1
CO3	3			2			1		1	1

**CO Vs PO and CO Vs PSO Mapping (ELECTRICAL ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3			2			1		1	
CO2	3	2					1		1	
CO3	3			2			1		1	

**CO Vs PO and CO Vs PSO Mapping ( INSTRUMENTATION ENGINEERING)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3			2			1	1	1
CO2	3	2					1	1	1
CO3	3			2			1	1	1

**Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organisation
1	Neelamkumar R. Sawant	State Head Technical Services for (Maharashtra and Goa)	JSW Cement ltd. Mumbai Head Office
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Head of Department

Coordinator,  
Curriculum Development,  
Department of Science And Humanities

Department of Science And Humanities

I/C, Curriculum Development Cell

Principal

Programme : <b>Diploma in CE/ME/IT/CO/IS/EE/EC/LG/LT (Sandwich Pattern)</b>										
Course Code: <b>HU19101</b>				Course Title: <b>Communication Skills</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs. 30 Min.)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>02</b>	<b>02</b>	<b>-</b>	<b>04</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>25*</b>	<b>-</b>	<b>25</b>	<b>150</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

**Note:** For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill tests are to be conducted. First skill test at midterm and second skill test at the end of the term.

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

In this context, it will help the engineering diploma students to select and apply the appropriate methods of communication in various situations and business communication. Students are also required basics of communication and use of different skills.

This course will guide and direct to develop a good personality and improve communication skills. It will enable the students to utilize the skills necessary to be a competent communicator.

**Course Outcomes:** Student should be able to

<b>CO1</b>	Apply proper communication technique to cope up with the challenges of the modern world.
<b>CO2</b>	Interpret feedback at various situations by using appropriate body language and avoid the barriers in effective communication.
<b>CO3</b>	Able to participate in Group Discussion and Acquire the practical knowledge of an interview.
<b>CO4</b>	Able to develop PowerPoint Presentation and Business correspondence.
<b>CO5</b>	Write letters, circulars, memos, notices, reports and communicate effectively in written communication.

**Course Content Details:**

<b>Unit No</b>	<b>Topics / Sub-topics</b>
<b>1</b>	<p><b>Introduction to Communication</b></p> <p>1.1 Elements of Communication 1.2 Communication Cycle 1.3 Types of communication 1.4 Definition and Types of Barriers-</p> <p>a) Mechanical b) Physical c) Language d) Psychological</p> <p>1.5 How to overcome Barriers</p> <p><b>Course Outcome: CO1      Teaching Hours :6 hrs      Marks: 14 (R- 2, U-4, A-8)</b></p>
<b>2</b>	<p><b>Non- verbal Communication</b></p> <p>2.1 Meaning and Importance of Non-verbal Communication 2.2 Body Language 2.3 Aspects of Body Language 2.4 Graphic language</p> <p><b>Course Outcome: CO2      Teaching Hours :6 hrs      Marks: 12 (R- 4, U-4, A-4)</b></p>
<b>3</b>	<p><b>Group Discussion And Interview Skills</b></p> <p>3.1 Need and Importance of Group Discussion 3.2 Use of Knowledge and Logical sequence. 3.3 Types of Interview 3.4 Preparing for an Interview</p> <p><b>Course Outcome: CO3      Teaching Hours :6 hrs      Marks: 10 (R-2, U-4, A-4)</b></p>
<b>4</b>	<p><b>Presentation Skills</b></p> <p>4.1 Presentation Skills - Tips for effective presentation 4.2 Guidelines for developing PowerPoint presentation</p> <p><b>Course Outcome: CO4      Teaching Hours :4 hrs      Marks: 08 (R- 2, U-2, A-4)</b></p>
<b>5</b>	<p><b>Business Correspondence</b></p> <p>5.1 Office Drafting – a) Notice b) Circular c) Memo d) Email-writing. 5.2 Job Application with resume. 5.3 Business Letters – a) Enquiry b) Order c) Complaint 5.4 Report Writing – a) Fall in Production b) Accident Report</p> <p><b>Course Outcome: CO5      Teaching Hours: 8 hrs      Marks: 16 (R- 4, U-4, A-8)</b></p>



**List of experiments: Any 10 experiments out of 15**

Sr. No.	Unit No	COs	List of Experiments	Hours
1	1	CO1,CO4	Conversation between students on various situations.	02
2	3	CO2,CO4	Non- Verbal Communication.	02
3	3	CO3,CO4	Group Discussion	02
4	4	CO3,CO4	Mock Interview	02
5	5	CO4,CO5	Business Communication a) Advertisement, Tender, Diary writing. b) Job Application With Resume.	02
6	1	CO1	Communication Barriers	02
7	5	CO5	Business Letters – a) Enquiry b)Order c)Complaint	02
8	4	CO1,CO4	Speeches- a)Welcome Speech b)Farewell Speech c) Vote of Thanks	02
9	5	CO5	Report Writing – a) Fall in Production b) Accident Report	02
10	All	CO4	Showing Videos on different types of Communication.	02
11		CO1	*Articles	02
12		CO1	*Preposition and Conjunction	02
13		CO1	*Direct Indirect Speech	02
14		CO1	*Change the voice	02
15		CO1	*Vocabulary Building	02
			<b>Total</b>	<b>30</b>

**Note:** Experiments No.1 to 10 are compulsory. Remaining experiments are to be performed on availability of time.\* These experiments will be performed during practical hours only.

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Communication Skills	Joyeeta Bhattacharya - Reliable Series	9780000176981, 0000176982
2	Communication Skills	Sanjay Kumar, PushpaLata- Oxford University Press	13: 978-0199488803
3	Successful presentation Skills	Andrew Brad bury- The Sunday Times	13: 9780749456627

**E-References:**

- 1) Website: [www.mindtools.com/page8.html-99k](http://www.mindtools.com/page8.html-99k)
- 2) Website: [www.inc.com/guides/growth/23032.html-4](http://www.inc.com/guides/growth/23032.html-4)
- 3) Website: [www.khake.com/page66htm/-72k](http://www.khake.com/page66htm/-72k)
- 4) Website: [www.BMConsultantIndiaConsultantIndia.Com](http://www.BMConsultantIndiaConsultantIndia.Com)
- 5) <https://www.vedantu.com/ncert-solutions/ncert-solutions-class-12-English>
- 6) MYCBSEGUIDE
- 7) Website: [www.letstak.co.in](http://www.letstak.co.in)
- 8) <https://learnenglishteens.britishcouncil.org/>

**CO Vs PO and CO Vs PSO Mapping (Civil Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	1	2	1
CO2	3	3	2	3	2	3	2	1	2	1
CO3	3	2	2	1	2	3	2	1	2	1
CO4	3	3	2	1	2	3	2	1	2	
CO5	3	3	2	1	2	3	2	1	2	

**CO Vs PO and CO Vs PSO Mapping (Mechanical Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	3	2	3	2	2	1
CO2	3	3	2	3	2	3	2	2	1
CO3	3	2	2	1	2	3	2	2	1
CO4	3	3	2	1	2	3	2	2	1
CO5	3	3	2	1	2	3	2	2	1

**CO Vs PO and CO Vs PSO Mapping (Electronics Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	2	2	
CO2	3	3	2	3	2	3	2	1	2	1
CO3	3	2	2	1	2	3	2	1	1	1
CO4	3	3	2	1	2	3	2	1		
CO5	3	3	2	1	2	3	2	1		

**CO Vs PO and CO Vs PSO Mapping (Electrical Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	1	2	3
CO2	3	3	2	3	2	3	2	2		3
CO3	3	2	2	1	2	3	2	2		3
CO4	3	3	2	1	2	3	2	1		2
CO5	3	3	2	1	2	3	2			

**CO Vs PO and CO Vs PSO Mapping (Instrumentation Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	3	2	3	2	1	2
CO2	3	3	2	3	2	3	2	1	2
CO3	3	2	2	1	2	3	2	1	2
CO4	3	3	2	1	2	3	2		2
CO5	3	3	2	1	2	3	2		

**CO Vs PO and CO Vs PSO Mapping (Computer Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	1	2	1
CO2	3	3	2	3	2	3	2	1	2	1
CO3	3	2	2	1	2	3	2	1	2	1
CO4	3	3	2	1	2	3	2		2	
CO5	3	3	2	1	2	3	2		2	

**COVs PO and CO Vs PSO Mapping (Information Technology)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	2	1	1
CO2	3	3	2	3	2	3	2	2	1	1
CO3	3	2	2	1	2	3	2	1		2
CO4	3	3	2	1	2	3	2	1		
CO5	3	3	2	1	2	3	2	1		

**CO Vs PO and CO Vs PSO Mapping (LG/LT Engineering)**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	1		2
CO2	3	3	2	3	2	3	2	1		2
CO3	3	2	2	1	2	3	2	1	1	2
CO4	3	3	2	1	2	3	2	1		2
CO5	3	3	2	1	2	3	2	1		2

**Industry Consultation Committee:**

Sr. No	Name	Designation	Institute/Organisation
1	Neelamkumar R. Sawant	State Head Technical Services for (Maharashtra and Goa)	JSW Cement Ltd. Mumbai Head Office
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3	Mrs.S.S. Kulkarni	Lecturer in English	Government Polytechnic Pune
4	Mrs. K.S.Pawar	Lecturer in English	Government polytechnic Mumbai
5	Ms.N.N.Dhake	Lecturer in English	Government polytechnic Mumbai

Coordinator,

Head of Department

Curriculum Development,  
Department of Science And Humanities

Department of Science And Humanities

I/C, Curriculum Development Cell

Principal



Programme : <b>Diploma in Mechanical Engineering &amp; Civil Engineering (Sandwich Pattern)</b>										
Course Code: <b>ME19201</b>				Course Title: <b>Engineering Drawing-I</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>2</b>	<b>4</b>	<b>--</b>	<b>6</b>	<b>--</b>	<b>--</b>	<b>-</b>	<b>50*</b>	<b>--</b>	<b>50</b>	<b>100</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

### Rationale:

Engineering drawing is the common graphical language of engineers, technicians and workers to express engineering ideas and concepts. Correct interpretation of engineering drawings is one of the basic duties of First Line Supervisors. Study of Engineering Drawing induces the concepts of accuracy and exactness of information necessary for the production of engineering component. It also develops judgements about distances and angles.

This basic course aims at building a foundation for the further courses in drawing and other allied subjects. This course is useful in developing imagination, drafting and sketching skills of the students.

**Course Outcomes:** Student should be able to

CO1	Draw geometric figures and engineering curves using appropriate drawing instruments
CO2	Draw views of line and plane, by applying principles of first angle method of projections
CO3	Draw orthographic views of given object by applying principles of orthographic projections
CO4	Draw isometric view from given orthographic views, by applying principles of isometric projections
CO5	Draw the free hand sketches of given engineering objects/elements

### Course Content Details:

Unit No	Topics / Sub-topics
1	<p><b>Principles of Drawing</b></p> <p>1.1 Drawing instruments and their uses, Standard sizes of drawing sheets (ISO-A series), letters and numbers (single stroke vertical), Conventions of lines and their applications, Drawing Scales (reduced, enlarge and full size), Methods of Dimensioning: Chain, parallel and coordinate dimensioning (Refer SP-46 Code latest Edition)</p> <p>1.2 Simple Geometrical Constructions, Redrawing figures using above geometrical constructions</p>
<p><b>Course Outcome- CO1      Teaching Hours – 04      Marks –06</b></p>	

2	<p><b>Engineering Curves and Loci of Points</b></p> <p>2.1 Method to draw Ellipse by Arcs of Circle Method and Concentric Circle Method.</p> <p>2.2 Method to draw Parabola and Hyperbola by Directrix and Focus Method.</p> <p>2.3 Methods to draw Involute of circle and pentagon,</p> <p>2.4 Methods to draw Cycloid,</p> <p>2.5 Loci of Points of Single Slider Crank Mechanism with given specifications.</p> <p><b>Course Outcome- CO1 Teaching Hours – 06 Marks –06</b></p>
3	<p><b>Projection of lines and planes</b></p> <p>3.1 Concepts of Reference Planes and Projections, Views – Top, Front, Side Views</p> <p>3.2 Projections of Line inclined to one reference plane (H.P/V.P) and limited to both ends in one quadrant only.</p> <p>3.3 Projections of simple planes of circular, square rectangular, rhombus, pentagonal and hexagonal shape, inclined to one reference plane and perpendicular to other</p> <p><b>Course Outcome- CO2 Teaching Hours – 06 Marks –10</b></p>
4	<p><b>Orthographic projections</b></p> <p>4.1 Introduction to orthographic projections, Symbol of First Angle Projection, Conversion of pictorial view into orthographic views –Top, Front and End View of objects containing plain surfaces, slant surfaces, slots, ribs, cylindrical surfaces. (First Angle Projection Method Only)</p> <p>4.2. Sectional Orthographic Views and conversion of pictorial view into sectional orthographic views</p> <p>(Objects involving plain surfaces, slant surfaces, slots, ribs, cylindrical surfaces, threads etc.)</p> <p><b>Course Outcome- CO3 Teaching Hours – 06 Marks –12</b></p>
5	<p><b>Isometric projections</b></p> <p>5.1 Isometric scale, Comparison of Natural Scale with Isometric Scale</p> <p>5.2 Conversion of Orthographic Views into Isometric View/Projection</p> <p>(Objects involving plain surfaces, slant surfaces, slots, ribs, cylindrical surfaces, holes etc)</p> <p><b>Course Outcome- CO4 Teaching Hours – 06 Marks –12</b></p>
6	<p><b>Freehand sketches</b></p> <p>6.1 Drawing of proportional freehand sketches of – Different types of thread forms, nuts, bolts, screws, washers and foundation bolts (Rag and Lewis type)</p> <p>(Teacher shall also explain use/ function of all the above elements)</p> <p><b>Course Outcome- CO5 Teaching Hours – 02 Marks –04</b></p>

**List of Sheets: All sheets compulsory**

Sr. No.	Unit No	List of Experiments	CO	Hours
1	1	<b>Basics of Engineering Graphics</b> Drawing sheet containing types of lines, Lettering, Redrawing given figure, dimensioning and geometrical constructions	CO1	08
2	2	<b>Engineering curves and loci points</b> (minimum 4 problems)	CO1	08
3	3	<b>Projections of Lines and Planes</b> Three cases on lines and three cases on planes	CO2	08
4	4	<b>Orthographic projections</b> Using first angle method of projections (minimum 2 problems)	CO3	08
5	4	<b>Sectional Orthographic projections</b> Using first angle method of projection (minimum 2 problems)	CO3	08
6	5	<b>Isometric Projection-I</b> Using isometric scale (minimum 2 objects)	CO4	08
7	5	<b>Isometric Projection-II</b> To draw isometric views of objects including slots, holes and sloping faces (minimum 2 objects)	CO4	08
8	6	<b>Free hand sketches</b> To draw free hand sketches of different types of threads forms, nuts, bolts and screws, foundation bolts.	CO5	04
<b>Total</b>				<b>60</b>

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Engineering drawing	N.D.Bhatt, Charotar Publishing House, 53 <sup>rd</sup> Edition, 2016	978-93-80358-178
2	Engineering Graphics	P.J. Shah, S. Chand, revised edition, 2014	978-81-21929-679
3	Engineering Drawing	Amar Pathak, Wiley Publication, 1 <sup>st</sup> Ed. 2010	978-93-50040-164
4	Engineering drawing	D.Jolhe, Tata McGraw Hill Education, 2017	978-00-70648-371
5	Textbook on engineering drawing	K.L.Narayan, P.Kannaiah, Scitech publications, 24 <sup>th</sup> reprint, 2010,	978-81-83714-228
6	Engineering drawing practice For school and colleges	IS Code SP-46	-

**E-References:**

1. <https://ocw.mit.edu/courses/drawing>
2. <https://nptel.in/courses/drawing>
3. <https://home.iiik.edp.ac.in>



**CO VsPO and CO Vs PSOMapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	1	1	1	2	1	1
CO2	2	2	2	1	1	1	2	1	1
CO3	3	2	2	2	1	2	2	1	1
CO4	3	2	2	2	2	2	2	1	1
CO5	2	1	1	1	1	1	2	1	1

**Industry Consultation Committee:**

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Coordinator,  
Curriculum Development,  
Department of Mechanical Engineering

Head of Departments  
Department of Mechanical Engineering

I/C, Curriculum Development Cell

Principal

Programme : <b>Diploma in ME/CE/IS/LG/LT/RT (Sandwich Pattern)</b>										
Course Code: <b>WS19201</b>				Course Title: <b>Workshop Practice</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs 30 minutes)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
--	<b>4</b>	--	<b>4</b>	--	--	--	--	--	<b>50</b>	<b>50</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination

Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

### Rationale:

Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. The knowledge of basic shops like Wood working, Fitting, Welding, Plumbing and Sheet Metal shop is essential for technicians to perform their duties in industries. Irrespective of engineering stream, the use of workshop practices in day to day industrial as well domestic life helps to solve various minor but critical problems. Working in workshop develops the attitude of working in a group and the basis for safety awareness is created. This foundation course intends to impart basic know-how of various hand tools and their use in different sections of manufacturing. The students are advised to undergo each skill experience with remembrance, understanding and application with special emphasis on attitude of enquiry to know why and how for the various instructions and practices imparted to them in each hop. Furthermore the demonstration of CNC Machine will give feel of advancement in industry.

**Course Outcomes:** Student should be able to

CO1	Lay-outing of shop & Sketching of jobs, tools & equipment.
CO2	Select appropriate tools, machinery, equipment and consumables for given application.
CO3	Use & Operate hand tools, equipment and machinery in different shops.
CO4	Prepare the simple jobs as per specification & drawing.
CO5	Maintain workshop related tools, equipment and machineries.

### Course Content Details:

Unit No	Topics / Sub-topics
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1	<p><b>1.1 Introduction to workshop:-</b></p> <p><b>1.2</b> Workshop layout, Importance of various sections/shop of workshop, Types of jobs done in each shop.</p> <p><b>1.3</b> Causes of accidents, general safety rules and work procedure in workshop, Safety signs and symbols, First Aid.</p> <p><b>1.4</b> Fire, Causes of Fire, Basic ways of extinguishing the fire. Classification of fire, Firefighting equipment, fire Extinguishers and their types.</p> <p><b>1.5</b> Issue and return system of tools, equipment and consumables.</p> <p><b>Course Outcome: CO1,CO2 Teaching Hours : 06Marks: 05 (R-NA, U- NA , A-NA)</b></p>
2	<p><b>Smithy and Forging:-</b></p> <p><b>2.1</b> Sketching, understanding the specifications, materials, various applications and methods used in Smithy and Forging shop along with use of tools like anvil, hammers, Swage block, tongs, chisels, flatters etc;</p> <p><b>2.2</b> Demonstration of Smithy and Forging operations like bending, setting down, bulging, Upsetting etc;</p> <p><b>2.3</b> Preparation of smithy &amp; forging, job.</p> <p><b>2.4</b> Safety precautions &amp; Personal Protective Equipments.</p> <p><b>Course Outcome: CO2,CO3,CO4Teaching Hours :10 Marks: 08(R-NA, U- NA ,A-NA)</b></p>
3	<p><b>Carpentry Section :-</b></p> <p><b>3.1</b> Types of wood and their applications.</p> <p><b>3.2</b> Types of carpentry hardware's and their uses.</p> <p><b>3.3</b> Sketching, understanding the specifications, materials, various applications and Methods used in Carpentry shop along with use of tools like saws, planner, chisels, Hammers, mallet, marking gauge, Vice, try square, rule, etc;</p> <p><b>3.4</b> Demonstration of carpentry operations such as marking, sawing, planning, chiseling, Grooving, boring, joining, etc;</p> <p><b>3.5</b> Preparation of wooden joints.</p> <p><b>3.6</b> Safety precautions &amp; Personal Protective Equipments.</p> <p><b>Course Outcome:CO2,CO3,CO4 Teaching Hours : 10 Marks: 08(R-NA ,U- NA, A-NA )</b></p>
4	<p><b>Welding Section :-</b></p> <p><b>4.1</b> Types, sketching, understanding the specifications, materials and applications of arc &amp; Gas welding Accessories and consumables.</p> <p><b>4.2</b> Demonstration of metal joining operations like arc welding, soldering and brazing. Show effect of Current and speed. Also demonstrate various welding positions.</p> <p><b>4.3</b> Demonstrate gas cutting operation.</p> <p><b>4.4</b> Preparation of metal joints.</p> <p><b>4.5</b> Safety precautions &amp; Personal Protective Equipments.</p> <p><b>Course Outcome:CO2,CO3,CO4 Teaching Hours : 10Marks: 08(R-NA, U- NA, A-NA )</b></p>

	<p><b>Fitting Section:-</b></p> <p><b>5.1</b> Sketching, understanding the specifications, materials, various applications and methods used in fitting, Marking, measuring, work holding, cutting &amp; finishing tools.</p> <p><b>5.2</b> Demonstration of various fitting operations such as chipping, filing, scraping, grinding, Sawing, marking, Drilling ,tapping, etc;</p> <p><b>5.3</b> Preparation of male, female joint.</p> <p><b>5.4</b> Safety precautions &amp; Personal Protective Equipments</p> <p><b>Course Outcome:CO2,CO3,CO4Teaching Hours :12 Marks:10(R-N , U- NA, A-NA )</b></p>
6	<p>Types, specification, material and applications of pipes.</p> <p><b>6.2</b> Types, specification, material, applications and demonstration of pipe fitting tools.</p> <p><b>6.3</b> Demonstration of pipe fitting operations such as marking, cutting, bending, threading, assembling, Dismantling etc;</p> <p><b>6.4</b> Types and application of various spanners such as flat, fix, ring, bo, adjustable,etc.</p> <p><b>6.5</b> Preparation of pipe fitting jobs.</p> <p><b>6.6</b> Concept and conversions of SWG and other gauges in use. Use of wire gauge.</p> <p><b>6.7</b> Safety precautions &amp; Personal Protective Equipments</p> <p><b>Course Outcome:CO2,CO3,CO4Teaching Hours : 06 Marks: 06(R-NA,U- NA,A-NA )</b></p>
7	<p><b>Lathe and CNC Operations :-</b></p> <p><b>7.1</b> Working principle of lathe along with sketch and procedure for its general mainte.</p> <p><b>7.2</b> Demonstration of Lathe machine operation like plain turning, taper turning, threading, Chamfering, etc.</p> <p><b>7.3</b> Simple job demonstration for a group on CNC Machine.</p> <p><b>Course Outcome:CO5Teaching Hours : 06 Marks: 05 (R-NA , U- NA , A-NA )</b></p>

**List of experiments:**

Sr. No.	Unit No	List of Experiments	CO	Hours
1	1	Causes of accidents, general safety rules and work procedure in workshop, Safety signs and symbols, First Aid. Perform mock drill session in group of minimum 10 students for Extinguishing fire.	CO1	06
2	2	Prepare job involving operations like bending, setting down, bulging, upsetting etc; e.g. Pegs ( Square/round), Hook, Hammer tongue, Agro equipment etc. ( Individually )	CO2	10
3	3	Prepare two wooden joints as per given drawings. ( Individually)	CO2,CO3, CO4	10
4	4	Prepare lap joint/butt joint using either arc / gas welding as per given drawing.( Individually )	CO2,CO3, CO4	10
5	5	Prepare one Male- Female type fitting job as per given drawing. ( Individually )	CO2,CO3, CO4	12
6	6	Prepare two pipe joints as per given drawings. ( Individually )	CO2,CO3, CO4	06

7	7	Demonstration of Lathe machine & CNC machine operations.	CO5	06
<b>Total</b>				<b>60</b>

**SUGGESTED STUDENT ACTIVITIES :-**List of proposed student activities like.

- a. Follow safety practices.
- b. Practice good housekeeping.
- c. Function as a team member.
- d. Maintain tools and equipment.
- e. Follow ethics & maintain discipline.
- f. Prepare work diary based on practical performed in workshop. Work diary consist of job drawing, operations to be Performed, required raw materials, tools, equipment, date of performance with signature of the teacher.
- g. Prepare journals consisting of free hand sketches of tools and equipment in each shop, detail specifications and Precautions to be observed while using tools and equipment.
- h. Prepare / Download specifications of following; i) various tools and equipment in various shop. ii) Precision Equipment in workshop iii) Various machineries in workshop.
- I. Undertake a market survey of local dealers for procurement of workshop tools, equipment machineries and raw material.
- J. Visit any fabrication / wood working / sheet metal / forging workshop and prepare a report.

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Workshop Technology - 1	Hazra and Chaudhary Media promoters & Publisher private limited.	ISBN: 9788185099149
2	Workshop Technology - 1	W.A.J.Chapman Taylor & francis.	SBN: 9780713132724
3	Workshop Practice Manual for Engineering Diploma & ITI Students	Hegde.R .K Sapna Book House, 2012,	ISBN: 13 : 9798128005830
4	Workshop familiarization.	E. Wilkinson Pitman engineering craft series.	ISBN: 0273316729
5	Mechanical workshop practice.	K.C.John PHI.	ISBN 10: 8120337212
6	Workshop practice manual	K. Venkata Reddy B. S. Publications.	ISBN-10: 8178001497
7	A Course in Workshop Technology	Raghuwanshi, B.S DhanpatRai sons, New Delhi	ISBN: 10 - 0000017108

**E-References:**

1. <http://www.asnu.com.nu> b.c.
2. <http://www.abmttools.com/downloads/Woodworking%20Carpentry%20Tools.pdf> d.

3. <http://www.weldingtechnology.org> e.<http://www.newagepublishers.com>
4. <http://www.youtube.com/watch?v=TeBX6cKKHWY> g
5. <http://www.youtube.com/watch?v=QHF0sNHnttw&feature=related> h
6. <http://www.youtube.com/watch?v=Kv1zo9CAxt4&feature=relmfu> i.
7. <http://sourcing.indiamart.com/engineerig/articles/materials-used-hand-tools/>

## CO VsPO and CO Vs PSOMapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	2	1	2	2	1	2	2
CO2	2	2	2	2	2	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2
CO4	3	3	3	3	3	3	3	2	2
CO5	2	2	2	2	2	2	2	2	2

## Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	S. V. Joshi	Lecturer	G. P. Mumbai
2	N. M. Ambadekar	Workshop Superintendent,	G. P. Thane
3	D. B. Jadhav	Senior Manager	Auto. Division, Mahindra and Mahindra Ltd., Kandivali

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Head of Departments  
Department of \_\_\_\_\_

I/C, Curriculum Development Cell

Principal

Programme : <b>Diploma in Civil Engineering (Sandwich Pattern)</b>										
Course Code: <b>CE19101</b>				Course Title: <b>Construction Materials</b>						
Compulsory / Optional: <b>Compulsory</b>										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs 30 min)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
<b>03</b>	--	--	<b>03</b>	<b>60</b>	<b>20</b>	<b>20</b>	--	--	--	<b>100</b>

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR- Practical, OR-Oral, TW: Term Work (progressive assessment) , \* Indicates assessment by External Examiner else internal practical skill test , # indicates Self, on- line learning Mode, @ indicates on line examination  
 Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

### Rationale:

Construction material is the key element in the construction project. A diploma engineer has to constantly deal with selection of materials for various engineering projects of constructions such as residential or commercial buildings, roads, metro, railways, bridges, dams, tunnels and fly-over. Modern techniques are developed to handle and use materials for economic and safer designs of engineering structures. At diploma level, students are expected to study about these aspects so as to develop their understanding, performance oriented abilities in order to apply their knowledge in construction industry.

**Course Outcomes:** Student should be able to

CO1	Identify relevant construction materials.
CO2	Identify relevant natural and artificial construction materials.
CO3	Select relevant special type construction materials.
CO4	Select relevant finishing materials for construction.
CO5	Identify relevant processed construction materials.

### Course Content Details:

Unit No	Topics / Sub-topics
1	<p><b>Introduction :</b></p> <p>1.1 Scope of construction materials in Construction Technology, Transportation Engineering, Environmental Engineering, Irrigation Engineering. (Applications only)</p> <p>1.2 Selection of materials for different civil engineering structures on the basis of strength, durability, ecofriendly and economy.</p> <p>1.3 Broad classification of materials – Sources, Natural, Artificial – special, finishing and recycled.</p> <p><b>Course Outcome: CO1 Teaching Hours : 4 hrs Marks: 08 (R-4, U-4, A-0)</b></p>

2	<p><b>Natural Construction Materials:</b></p> <p>2.1 Stone : Requirements of good building stone, characteristics, tools for stone</p> <p>2.2 Timber : Structure, properties, seasoning, preservation, defects</p> <p>2.3 Asphalt, bitumen and tar : properties, uses</p> <p>2.4 Lime : types, uses</p> <p>2.5 Soil : types, suitability in construction</p> <p>2.6 Sand : properties, uses</p> <p>2.7 Course aggregate : classification according to size , uses</p> <p><b>Course Outcome: CO2 Teaching Hours : 12 hrs Marks: 14 (R-6, U-6, A-2)</b></p>
3	<p><b>Construction of Road Paveme Artificial Construction Materials :</b></p> <p>3.1 Brick: Conventional/Traditional bricks, modular and standard bricks, characteristics, classification, field tests on bricks.</p> <p>3.2 Flooring tiles : types, uses</p> <p>3.3 Cement : types, uses</p> <p>3.4 Pavement blocks, pre-cast concrete block</p> <p>3.5 Glass : soda lime glass, lead glass and borosilicate glass and their uses</p> <p>3.6 Plywood, particle board, veneers, laminated board and their uses</p> <p>3.7 Ferrous and non-ferrous metals and their uses</p> <p><b>Course Outcome:CO2 Teaching Hours : 14 hrs Marks:14 (R-6, U-6, A-2)</b></p>
4	<p><b>Special Construction Materials:</b></p> <p>4.1 Waterproofing materials, Termite proofing materials, Thermal &amp; Sound insulating materials : types, suitability in construction</p> <p>4.2 Fibers : types – jute, glass, plastic asbestos fibers – uses</p> <p>4.3 Geopolymer cement : properties, applications</p> <p><b>Course Outcome:CO3 Teaching Hours : 6 hrs Marks:08 (R-4, U-4, A-0)</b></p>
5	<p><b>Finishing Materials :</b></p> <p>5.1 Plastering materials : lime mortar, cement mortar – uses</p> <p>5.2 Plaster of Paris (POP) : constituents, uses</p> <p>5.3 Paints : oil paints, distempers, varnishes- uses</p> <p><b>Course Outcome:CO4 Teaching Hours : 6 hrs Marks:08 (R-4, U-4, A-0)</b></p>
6	<p><b>Processed Construction Materials :</b></p> <p>6.1 Industrial waste materials : fly ash, blast furnace slag, granite, marble polishing waste – uses</p> <p>6.2 Agro waste materials : Rice husk, bagasse, coir fibres – uses</p> <p>6.3 Special processes construction materials : Geosynthetic, ferrocrete, artificial timber, artificial sand – uses</p> <p><b>Course Outcome:CO5 Teaching Hours : 6 hrs Marks: 08 (R-2, U-2, A-4)</b></p>

### Suggested Specifications Table (Theory):

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Introduction	4	4	--	08
2	Natural Construction Materials	6	6	2	14



3	Artificial Construction Materials	6	6	2	14
4	Special Construction Materials	4	4	--	08
5	Finishing Materials for Construction	4	4	--	08
6	Processed Construction Materials	2	2	4	08
<b>Total</b>		<b>26</b>	<b>26</b>	<b>08</b>	<b>60</b>

**References/ Books:**

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Construction Materials	Ghose D.N., Tata MacGraw Hill, New Delhi	ISBN : 0074516477
2	Building Materials	Varghese P.C., PHI Learning, New Delhi	ISBN-10: 9788120350915
3	Engineering Materials	Rangwala S.C., Charator Publisher, Ahemadabad	ISBN : 978-93-85039-17-1
4	Civil Engineering Materials	Somayaji, Shah, Pearson education, New Delhi	ISBN 10: 0131776436

**E-References:**

- 1) <https://www.engineeringcivil.com>
- 2) [www.youtube.com/](http://www.youtube.com/)
- 3) <http://civildigital.com>
- 4) <http://www.quora.com>
- 5) <http://www.nationallibrary.gov.in>

**CO Vs PO and CO Vs PSO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	--	1	3	--	2	--	3	--
CO2	3	3	--	1	3	--	2	--	3	--
CO3	3	2	--	1	3	--	2	--	3	--
CO4	3	2	--	1	3	--	2	--	3	--
CO5	3	3	--	1	3	--	2	--	3	--

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Head of Department  
Department of Civil Engg.

I/C, Curriculum Development Cell

Principal



## **CE 19102 Libre Office Calc**

### **1. Introduction to Libre Office Calc (Foss: LibreOffice Calc on BOSS Linux – English)**

**Outline:** Introduction to LibreOffice Calc What is Calc, Who should use Calc, What can be done using Calc. About spreadsheets, sheets and cells. Basic features – parts of main Ca.

### **2. Working with Cells**

**Outline:** Working with Cells How to enter numbers, text, numbers as text, date and time in Calc. How to Navigate between cells and in between sheets. How to select items in row.

### **3. Working with Sheets**

**Outline:** Working with Sheets Inserting and Deleting rows and columns Calc. Inserting and Deleting Sheets in Calc. Renaming Sheets

### **4. Formatting Data**

**Outline:** Formatting Data Borders, Color, Formatting Text, Increasing Cell Size Formatting multiple lines of text, numbers, fonts, cell borders, cell background Automatic Wrappi.

### **5. Basic Data Manipulation**

**Outline:** Basic Data Manipulation Paste and paste special (values, transpose), pasting a spread sheet into writer as a table Introduction to Formulas – Sum, Average, basic formula.

### **6. Working with Data**

**Outline:** Working with data Speed up using Fill tools and Selection lists. Sharing content between sheets Remove data, Replace data, Change part of a data.

### **7. Using Charts & Graphs**

**Outline:** Using Charts and graphs in Calc Creating, Editing and Formatting Charts Types of charts Resizing and moving of charts

### **8. Formulas & Functions**

**Outline:** Formulas and Functions Creating formulas, operator types and referencing Basic arithmetic and statistic functions - relative and fixed (\$) referencing in a function .

### **9. Linking Calc Data**

**Outline:** Linking Calc Data Referencing other sheets and documents Working with Hyperlinks