Government Polytechnic, Mumbai

Department of Civil Engineering

P-19R Curriculum

(Sandwich Pattern)

With Effect From AY 2022-23

Semester-I

(Course Contents)

GOVERNMENT POLYTECHNIC MUMBAI

(Academically Autonoums Instititute, Government of Maharashtra)

Teaching and Examination Scheme (P19R)

With effect from AY 2022-23

Programme:Diploma in Civil Engineering (Sandwich Pattern)(Term / Semester – I)

Course Code	Course Title	Teaching Hours/Contact Hours				Credits	Examination Scheme (Marks)						
							Theory			PR	OR	TW	Total
		L	P	TU	Total		TH	TS1	TS2				
SC19R107	Engineering Chemistry	3	2	--	5	5	60	20	20	25*	--	25	150
SC19R109	Basic Mathematics	4	--	--	4	4	60	20	20	--	--		100
HU19R105	Business Communication	2	2	--	4	4	60	20	20	--	--	50	150
ME19R201	Engineering Drawing I	2	4	--	6	6	--	--	--	50*	--	50	100
WS19R201	Workshop Practice	--	4	--	4	4	--	--	--	--	--	50	50
CE19R101	Construction Materials	3	--	--	3	3	60	20	20	--	--	--	100
CE19R102	Libre Office Calc on BOSS Linux (9) (Spoken Tutorials)	--	4#	--	4	4#	--	--	--	--	--	--	--
UV19R101	Universal Human Values-I	--	--	--	--	2	--	--	--	--	--	--	--
	Total	**14**	**16**	**--**	**30**	**32**	**240**	**80**	**80**	**75**	**--**	**175**	**650**
Student Centered Activity(SCA)					**05**								
Total Contact Hours					**35**								

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

In-Charge Curriculum Development Cell

Head of Departments Department of Civil Engineering

Principal

Programme: Diploma in CE/ME (Sandwich Pattern)										
Course Code: SC19R107				Course Title: Engineering Chemistry						
Compulsory / Optional: Compulsory										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2.30 Hrs.)	TS1 (1 Hr.)	TS2 (1Hr)	PR	OR	TW	Total
3	**2**	**--**	**5**	**60**	**20**	**20**	**25***	**---**	**25**	**150**

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 and environmental and safety concerns.
CO5	Select suitable Lubricants, material for a particular use effectively.

Course Content Details:

Unit No	Topics / Sub-topics
1	**Atomic Structure** 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. 1.2 Atomic number and atomic mass number. Atomic weight Numerical based on atomic number & atomic mass number 1.3 Rules governing filling up of atomic orbitals, Quantum Numbers.'Pauli's Exclusive Principle, Aufbau's Principle, Hund's rule. Electronic configuration of atoms up to atomic number 30 1.4 Valency and chemical bonding. Valency: Definition, & examples. Types of valancy Electrovalency & Co Valency 1.5 Electrovalent bond: Definition, Formation. Formation of NaCl, 1.6 Co-valent bond: Definition & formation Formation of following molecules Single bond: Chlorine, HCl Double bond : Oxygen, Triple Bond : Nitrogen, Acetylene. 1.7 Distinction between electrovalent and covalent compound. **Course Outcome: CO1 Teaching Hours : 8 hrs Marks: 10 (R- 2, U-4, A-4)**
2	**ELECTROCHEMISTRY** 2.1.Definition of Electrochemistry, Electrolytes their definition and types,Difference between Atom and Ion,Definition of Ionization and Electrolytic Dissociation, Arhenous Theory,Degree of Ionization with factors affecting it. 2.2. Terms related to Electrolysis,Mechanism of Electrolysis,Example of Mechanism of Electrolysis of $CuSO_4$ using Copper Electrodes. 2.3 Faradays first law and its mathematical derivation. Faradays second law & its mathematical derivation, Numerical based on laws of Faraday. 2.4 Application of Electrolysis: Electroplating. **Course Outcome: CO2 Teaching Hours : 8 hrs Marks: 10 (R- 4 , U-4 , A-2)**
3	**WATER** 3.1Sources of water, Impurities present in water (suspended, dissolved, colloidal, biological) Types of water : Hard water, Causes of hardness of water Types of Hardness, Unit of hardness, Definition of hardness. 3.2 Bad effects of Hard Water for Domestic purpose Industrial purposes (Textile ,Dyeing, Sugar industry, Bakery) 3.3 Bad effects of hard water in Boiler, Scales and Sludge's, causes of their formation, their disadvantages and their removal. 3.4 Treatment of hard water for industrial purposes by Zeolite &Ion Exchange process 3.5 Treatment of hard water for drinking purpose. (city water supply) Various steps: Screening, Sedimentation, Coagulation, Filtration, Sterilization by boiling. 3.6 pH value: Definition, Formula, pH scale, its salient features, Numerical based on pH, Applications of pH related to Engineering field (corrosion of bridges, Electroplating,). **Course Outcome: CO3 Teaching Hours : 8 hrs Marks: 10 (R-2 , U- 4 , A-4)**

4	**Corrosion** 4.1 Definition of corrosion. Types of corrosion. Atmospheric & Electrochemical Corrosion. 4.2 Mechanism of atmospheric corrosion, types of oxide films formed,(stable, unstable, volatile, with examples) 4.3 Electrochemical corrosion/immersed corrosion Definition. Example. Factors Affecting, Atmospheric & Electrochemical Corrosion. 4.4 Protection of metals from Corrosion:- By protective coatings a)organic coating (Paints and Varnishes), b)inorganic coating (Metallic Coating) 4.5 Different methods of Protective metallic coatings. A) Hot dipping (Galvanizing & Tinning) b) Sherardizing c) Metal Spraying **Course Outcome: CO4 Teaching Hours :8 hrs Marks: 10 (R-2, U- 4 , A-4)**
5	**Lubricants** 5.1 Definition of lubricant, example, functions of lubricant, classification of lubricants (solid, semi-solid and liquid) examples. Conditions under which each lubricant is used. 5.2 Lubrication: definition and types conditions under which each lubricant is used. Types of lubrications: Fluid film, Boundary, Extreme pressure lubrication. Definition, diagram & description of each type 5.3 Characteristic of good lubricant A) Physical Characteristics : Viscosity • Viscosity index • Oiliness • Volatility • Flash point & Fire Point • Cloud and Pour point B) Chemical Characteristics • Acidity, Neutralization no. • Emulsification Saponification value **Course Outcome: CO5 Teaching Hours : 6 Marks: 10 (R- 4 , U-4 , A-2)**
6	**Non-metallic Engineering Material** 6.1 Definition of non-metallic engineering materials 6.2 Plastic : 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 Accelerators etc.,) Properties and engineering applications of plastic. 6.3 Rubber: definition of rubber (elastomer) Natural rubber : Basic unit in natural rubber(isoprene) Occurrence & Processing of Latex .Drawbacks of natural Rubber, Vulcanization Of rubber: D 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

	6.4 Thermal insulating materials Definition, Examples Thermocole, Glass wool. Thermocole: Definition, Preparation, Properties & uses, Glass wool: Definition, Preparation, Properties & uses **Course Outcome: CO5 Teaching Hours : 7 hrs Marks: 10 (R- 2 , U- 6 , A- 2)**

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	Non-metallic Engineering Materials	02	06	02	10
	Total	16	26	18	60

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 Of 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 : Cu^{++}, Fe^{++}, Fe^{+++}, Cr^{+++}, Mn^{++}, Ni^{++}, Zn^{++}, Ca^{++}, Ba^{++}, Mg^{++} $NH4^{+}$ Acidic Radicals: Cl^{-} ,Br^{-},I^{-},CO_3^{--}, SO_4^{--},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
			Total	**30**

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.R. 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 I and 2	J.C. Kurlacose, J. Jairam Tata Mcgraw hill.	9780074517352

E-References:

1. www. chemistry.org
2. www.ferrofchemistry.com
3. www.chemistryclassroom.com
4. http;//hperchemistry.chem.gsu.edu/hbase/hph.htm
5. www.youtube/chemistry
6. 6.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

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
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

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CDC Co-ordinator
G. P. Mumbai

Programme : **Diploma in CE/ME/CO/IF/EC/EE/IS**										
Course Code: **SC19R109**				Course Title: **BASIC MATHEMATICS**						
Compulsory / Optional: Compulsory										
Teaching Scheme and Credits				Examination Scheme						
TH	PR	TU	Total	TH (2 Hrs 30 Min.)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
4	--	--	**4**	**60**	**20**	**20**	--	---	--	**100**

Abbreviations: TH- Theory; PR-Practical; TU-Tutorial; TS1 and TS2- Term Tests; OR-Oral Exam; TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal assessment
Note: For Minimum passing marks under various heads, refer, examination rule AR26.

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

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

Course Content Details:

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

Suggested Specifications Table (Theory):

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

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
2. www.Scilab.org/-SCI Lab
3. www.mathworks.com/Products/Matlab/-MATLAB
4. www.wolfram.com/mathematica/-Mathematica
5. https://www.khanaacademy.org/math?gclid=CNqHuabCys4CFdoJaAoddHoPig
6. www.dplot.com/-Dplot
7. www.allmathcad.com/-Math CAD
8. 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	Mr.G.D.Rao	Sr. Engineer	Evershine PVT.Ltd.Mumbai
2	Mr.Pranshant Anvekar	Sr. Engineer	Innovative Energy Services, Mumbai
3	Mr. A.S.Patil	Lecturer in Mathematics	Government polytechnic Mumbai
4	Mr.V.S.Patil	Lecturer in Mathematics	Government polytechnic Mumbai

Coordinator,
Curriculum Development,
Department of Sci. & Humanities

Head of Departments
Department of Sci. & Humanities

I/C, Curriculum Development Cell

Principal

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COC Co-ordinator
G. P. Mumbai

Programme : Diploma in CE/ME/IT/CO/IS/EE/EC/LG/LT/RT (Sandwich Pattern)										
Course Code: HU19R105				Course Title: Business Communication						
Compulsory / Optional: **Compulsory**										
Teaching Scheme and Credits				Examination Scheme						
TH	PR	TU	Total	TH (2 Hrs. 30 Min.)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
02	**02**	**-**	**04**	**60**	**20**	**20**	**-**	**-**	**50**	**150**

Abbreviations: TH- Theory; PR-Practical; TU-Tutorial; TS1 and TS2- Term Tests; OR-Oral Exam; TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal assessment

Note: For Minimum passing marks under various heads, refer, examination rule AR26.

Rationale: Communication plays a vital and decisive role in career development. It is very important for thesmooth functioning of any business or organization. Effective business communication is how employees & Management interact with each other to reach organizational goals & be more aligned with the core company / business values. This course introduces not only basic concepts of communication like types of communication, barriers in communication, group discussion, interview skills, presentation skills but alsoBusiness Correspondence which will well equip students to express themselves effectively in all forms ofcommunication especially in written form. It will enhance the skills to communicate effectively and skillfully at workplace. It will guide and direct students to develop a good personality and improve communication skills.

Course Outcomes: Student should be able to

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

Course Content Details:

Unit No	Topics / Sub-topics
1	**Introduction to Communication** 1.1 Elements of Communication 1.2 Communication Cycle 1.3 Types of communication 1.4 Definition and Types of Barriers- a)Mechanical b)Physical c)Language d)Psychological 1.5 Ways to overcome Barriers **Course Outcome: CO1 Teaching Hours :6 hrs Marks: 14 (R- 2, U-4, A-8)**
2	**Non- verbal Communication** 2.1 Meaning and Importance of Non-verbal Communication 2.2 Body Language 2.3 Aspects of Body Language 2.4 Graphic language **Course Outcome: CO2 Teaching Hours :6 hrs Marks: 12 (R- 4, U-4, A-4)**
	Group Discussion And Interview Skills 3.1 Need and Importance of Group Discussion

3	3.2 Use of Knowledge and Logical sequence of ideas in Group Discussion 3.3 Types of Interview 3.4 Preparing for an Interview **Course Outcome: CO3 Teaching Hours :6 hrs Marks: 10 (R-2, U-4, A-4)**
4	**Presentation Skills** 4.1 Presentation Skills - Tips for effective presentation 4.2 Guidelines for developing PowerPoint presentation
	4.3 Business Etiquette **Course Outcome: CO4 Teaching Hours :4 hrs Marks: 08 (R- 2, U-2, A-4)**
5	**Business Correspondence** 5.1 Office Drafting – a) Notice b) Circular c) Memo d) Email-writing – Email etiquette, drafting formal / informal email 5.2 Personal Letter 5.3 Job Application with resume. 5.4 Business Letters – a) Enquiry b)Order c)Complaint 5.5 Report Writing – a) Fall in Production b) Accident Report **Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 16 (R- 4, U-4, A-8)**

Suggested Specifications Table (Theory):

Unit No	Topic Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Introduction to Communication	2	4	8	14
2	Non- verbal Communication	4	4	4	12
3	Group Discussion And Interview Skills	2	4	4	10
4	Presentation Skills	2	2	4	8
5	Business Correspondence	4	4	8	16
Total		**14**	**18**	**28**	**60**

List of Assignments :

Sr. No.	List of Experiments	COs	Hours
1	Listening Practice	CO1	03
2	Reading Practice	CO1	03
3	Writing Practice and E-Note	CO5	03
4	Communication Practice and Impromptu Communication.	CO4	03
5	Introduction to Vocabulary	CO5	03
6	Conversation between students on various situations.	CO2	03
7	Non- Verbal Communication.	CO2	03
8	Group Discussion	CO3	03
9	Mock Interview	CO3	03
10	Grammar • Tenses • Transformation of sentences • Articles • Subject Pronoun - Singular & Plural • Verbs	CO5	03
	Total		**30**

Note: .Students should complete all assignments & activities of Basic & Level 1 of Online course – "Business Communication Excellence" on Infosys Springboard. At the end of term, it is mandatory to submit certificates of Basic and Level 1 of Online course –"Business Communication Excellence", on Infosys Springboard. Only after that their Term Work will be granted.

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
4	Business Communication Using Computers	Dr.Yogesh T.Malshette Sonali Malshette Nirali Prakashan	

E-References:

1. Website: www.mindtools.com/page8.html-99k
2. Website:www.inc.com/guides/growth/23032.html-4
3. Website: www.khake.com/page66htm/-72k
4. https://www.vedantu.com/ncert-solutions/ncert-solutions-class-12-English
5. Website: www.letstak.co.in
6. https://infyspringboard.onwingspan.com/

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	1	2	1	2	3	2	----	2	----	----
CO2	1	2	2	2	2	3	2	----	2	----	----
CO3	2	2	2	2	2	3	2	----	2	----	----
CO4	2	3	2	2	2	3	2	----	2	----	----
CO5	1	1	2	2	3	3	3	----	2	----	----

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

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

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	----
CO2	3	3	2	3	2	3	2	----	----	2
CO3	3	2	2	1	2	3	2	----	2	----
CO4	3	3	2	1	2	3	2	----	----	----
CO5	3	3	2	1	2	3	2	----	----	----

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	2
CO2	3	3	2	3	2	3	2	2	2	2
CO3	3	2	2	1	2	3	2	----	1	1

CO4	3	3	2	1	2	3	2	1	3	3
CO5	3	3	2	1	2	3	2	2	2	2

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

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

CO Vs 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	2	2
CO2	3	3	2	3	2	3	2	1	1	1
CO3	3	2	2	1	2	3	2	1	2	2
CO4	3	3	2	1	2	3	2	2	2	1
CO5	3	3	2	1	2	3	2	1	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	JSW Cement ltd. Mumbai Head Office
2	Shri. Ritesh Bharambe	Manager-Sales	JAI Instruments and Systems Pvt.Ltd
3	Shri. Aniket Mhala	Global Head – Technology & Innovation Hub	Oracle financial services and software
4	Mrs. S. S. Kulkarni	Lecturer in English	Government Polytechnic Pune
5	Mrs. K.S.Pawar	Lecturer in English	Government polytechnic Mumbai
6	Ms. N. N. Dhake	Lecturer in English	Government polytechnic Mumbai

Coordinator,

(MS. K.S.Pawar) (MS. N.N.Dhake)

Curriculum Development,

Department of Science And Humanities

Head of Departments

Department of Science And Humanities

I/C, Curriculum Development Cell

Principal
Government Polytechnic Mumbai

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CDC Co-ordinator
G. P. Mumbai

Programme : ME/CE/IS (Sandwich Pattern)									
Course Code: WS19R201				Course Title: Workshop Practice					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
L	P	TU	Total	TH (2 Hrs 30 minutes)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
-	4	-	4	-	-	-	-	-	50	50

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.

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: At the end of the course student will 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
1	**Introduction to workshop** 1.1 Workshop layout, Importance of various sections/shop of workshop, Types of jobs done in each shop. 1.2 Causes of accidents, general safety rules and work procedure in workshop, Safety signs and symbols, First Aid. 1.3 Fire, Causes of Fire, Basic ways of extinguishing the fire. Classification of fire, Firefighting equipment, fire Extinguishers and their types. 1.4 Issue and return system of tools, equipment and consumables. **Course Outcome: CO1,CO2 Teaching Hours: 06**
2	**Smithy and Forging** 2.1 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. 2.2 Demonstration of Smithy and Forging operations like bending, setting down, bulging, Upsetting etc. 2.3 Preparation of smithy & forging, job. 2.4 Safety precautions & Personal Protective Equipment **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:10**
3	**Carpentry Section** 3.1 Types of wood and their applications 3.2 Types of carpentry hardware's and their uses 3.3 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. 3.4 Demonstration of carpentry operations such as marking, sawing, planning, chiseling, Grooving, boring, joining, etc. 3.5 Preparation of wooden joints 3.6 Safety precautions & Personal Protective Equipment **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:10**
4	**Welding Section** 4.1 Types, sketching, understanding the specifications, materials and applications of arc & Gas welding accessories and consumables 4.2 Demonstration of metal joining operations like arc welding, soldering and brazing, effect of Current and speed. Also demonstrate various welding positions. 4.3 Demonstrate gas cutting operation. 4.4 Preparation of metal joints. 4.5 Safety precautions & Personal Protective Equipments. **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:10**

5	**Fitting Section** 5.1 Sketching, understanding the specifications, materials, various applications and methods used in fitting, marking, measuring, work holding, cutting & finishing tools. 5.2 Demonstration of various fitting operations such as chipping, filing, scraping, grinding, Sawing, marking, Drilling ,tapping, etc. 5.3 Preparation of male, female joint. 5.4 Safety precautions & Personal Protective Equipments **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:12**
6	**Plumbing Section** 6.1 Types, specification, material, applications and demonstration of pipe fitting tools. 6.2 Demonstration of pipe fitting operations such as marking, cutting, bending, threading, assembling, Dismantling etc. 6.3 Types and application of various spanners such as flat, fix, ring, box, adjustable etc. 6.4 Preparation of pipe fitting jobs. 6.5 Concept and conversions of SWG and other gauges in use. Use of wire gauge. 6.6 Safety precautions & Personal Protective Equipments **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours: 06**
7	**Lathe and CNC Operations** 7.1 Working principle of lathe along with sketch. Maintenance procedure of Lathe Machine. 7.2 Demonstration of Lathe machine operation like plain turning, taper turning, threading, chamfering, etc. 7.3 Simple job demonstration for a group on CNC Mill/lathe Machine. **Course Outcome:CO5 Teaching Hours: 06**

List of experiments:

Sr. No.	Unit No	CO	List of Experiments	Hours
1	1	CO1	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.	06
2	2	CO1,CO2,CO 3,CO4, CO5	Prepare job involving operations like bending, setting down, bulging, upsetting etc; e.g. Pegs (Square/round), Hook, Hammer tongue, Agro equipment etc. (Individually)	10
3	3	CO1,CO2,CO 3,CO4, CO5	Prepare two wooden joints as per given drawings. (Individually)	10
4	4	CO1,CO2,CO 3,CO4, CO5	Prepare lap joint/butt joint using either arc / gas welding as per given drawing.(Individually)	10
5	5	CO1,CO2,CO 3,CO4, CO5	Prepare one Male- Female type fitting job as per given drawing. (Individually)	12
6	6	CO1,CO2,CO 3,CO4, CO5	Prepare two pipe joints as per given drawings. (Individually)	06
7	7	CO5	Demonstration of Lathe machine & CNC machine operations	06
			Total	**60**

Department of Workshop

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.	978-8185-0991-49
2	Workshop Technology - 1	W.A.J. Chapmam Taylor & Francis.	978-0713-1326-94
3	Workshop Practice Manual for Engineering Diploma & ITI Students	Hegde.R .K, Sapna Book House, 2012,	979-8128-0058-30
4	Workshop Familiarization	E. Wilkinson Pitman engineering craft series, 1972	978-0273-3167-56
5	Mechanical workshop practice.	K.C.John, PHI, 2010	978-812-03416-61
6	Workshop practice manual	K. Venkata Reddy, B. S. Publications, 6th Ed, 2015	978-8178-0030-78

E-References:

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2. http://wwwabmtools.com/downioads/Woodworking%20Carpentry%20Tools.pdf d.
3. http://www.weldingtechnology.org e.http://www.newagepublishers.com
4. http://wwwyoutube.com/watch?v=TeBX6cKKHWY g
5. http://wwwyoutube.com/watch?v=QHF0sNHnttw&feature=related h
6. http://www.youtube.com/watch?v= K v l zo9CAxt4&feature=relmfu i.
7. http://sourcing.indiamart.com/engineerig/articles/materials-used-hand-tools/

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

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

Department of Workshop

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
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	--

CO Vs PO and CO Vs PSO Mapping (Instrumentation)

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

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Shri. S. V. Joshi	Lecturer in Mechanical Engineering & I/c Workshop Superintendent	Govt. Polytechnic, Mumbai
2	Shri. N. M. Ambadekar	Workshop Superintendent,	Govt. Polytechnic, Thane
3	Shri. D. B. Jadhav	Senior Manager	Auto. Division, Mahindra and Mahindra Ltd., Kandivali

Coordinator,
Curriculum Development,
Department of Mechanical Engineering

Workshop Superintendent
Dr. V. U. Rathod
Department of Workshop

I/C, Curriculum Development Cell

Principal

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(Approved Copy)
CDC Co-ordinator
G. P. Mumbai

Programme : ME/CE/IS (Sandwich Pattern)										
Course Code: WS19R201				Course Title: Workshop Practice						
Compulsory / Optional: Compulsory										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total	TH (2 Hrs 30 minutes)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
-	4	-	4	-	-	-	-	-	50	50

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.

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: At the end of the course student will 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
1	**Introduction to workshop** 1.1 Workshop layout, Importance of various sections/shop of workshop, Types of jobs done in each shop. 1.2 Causes of accidents, general safety rules and work procedure in workshop, Safety signs and symbols, First Aid. 1.3 Fire, Causes of Fire, Basic ways of extinguishing the fire. Classification of fire, Firefighting equipment, fire Extinguishers and their types. 1.4 Issue and return system of tools, equipment and consumables. **Course Outcome: CO1,CO2 Teaching Hours: 06**
2	**Smithy and Forging** 2.1 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. 2.2 Demonstration of Smithy and Forging operations like bending, setting down, bulging, Upsetting etc. 2.3 Preparation of smithy & forging, job. 2.4 Safety precautions & Personal Protective Equipment **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:10**
3	**Carpentry Section** 3.1 Types of wood and their applications 3.2 Types of carpentry hardware's and their uses 3.3 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. 3.4 Demonstration of carpentry operations such as marking, sawing, planning, chiseling, Grooving, boring, joining, etc. 3.5 Preparation of wooden joints 3.6 Safety precautions & Personal Protective Equipment **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:10**
4	**Welding Section** 4.1 Types, sketching, understanding the specifications, materials and applications of arc & Gas welding accessories and consumables 4.2 Demonstration of metal joining operations like arc welding, soldering and brazing, effect of Current and speed. Also demonstrate various welding positions. 4.3 Demonstrate gas cutting operation. 4.4 Preparation of metal joints. 4.5 Safety precautions & Personal Protective Equipments. **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:10**

5	**Fitting Section** 5.1 Sketching, understanding the specifications, materials, various applications and methods used in fitting, marking, measuring, work holding, cutting & finishing tools. 5.2 Demonstration of various fitting operations such as chipping, filing, scraping, grinding, Sawing, marking, Drilling ,tapping, etc. 5.3 Preparation of male, female joint. 5.4 Safety precautions & Personal Protective Equipments **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours:12**
6	**Plumbing Section** 6.1 Types, specification, material, applications and demonstration of pipe fitting tools. 6.2 Demonstration of pipe fitting operations such as marking, cutting, bending, threading, assembling, Dismantling etc. 6.3 Types and application of various spanners such as flat, fix, ring, box, adjustable etc. 6.4 Preparation of pipe fitting jobs. 6.5 Concept and conversions of SWG and other gauges in use. Use of wire gauge. 6.6 Safety precautions & Personal Protective Equipments **Course Outcome: CO1,CO2,CO3,CO4, CO5 Teaching Hours: 06**
7	**Lathe and CNC Operations** 7.1 Working principle of lathe along with sketch. Maintenance procedure of Lathe Machine. 7.2 Demonstration of Lathe machine operation like plain turning, taper turning, threading, chamfering, etc. 7.3 Simple job demonstration for a group on CNC Mill/lathe Machine. **Course Outcome:CO5 Teaching Hours: 06**

List of experiments:

Sr. No.	Unit No	CO	List of Experiments	Hours
1	1	CO1	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.	06
2	2	CO1,CO2,CO 3,CO4, CO5	Prepare job involving operations like bending, setting down, bulging, upsetting etc; e.g. Pegs (Square/round), Hook, Hammer tongue, Agro equipment etc. (Individually)	10
3	3	CO1,CO2,CO 3,CO4, CO5	Prepare two wooden joints as per given drawings. (Individually)	10
4	4	CO1,CO2,CO 3,CO4, CO5	Prepare lap joint/butt joint using either arc / gas welding as per given drawing.(Individually)	10
5	5	CO1,CO2,CO 3,CO4, CO5	Prepare one Male- Female type fitting job as per given drawing. (Individually)	12
6	6	CO1,CO2,CO 3,CO4, CO5	Prepare two pipe joints as per given drawings. (Individually)	06
7	7	CO5	Demonstration of Lathe machine & CNC machine operations	06
			Total	**60**

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.	978-8185-0991-49
2	Workshop Technology - 1	W.A.J. Chapmam Taylor & Francis.	978-0713-1326-94
3	Workshop Practice Manual for Engineering Diploma & ITI Students	Hegde.R .K, Sapna Book House, 2012,	979-8128-0058-30
4	Workshop Familiarization	E. Wilkinson Pitman engineering craft series, 1972	978-0273-3167-56
5	Mechanical workshop practice.	K.C.John, PHI, 2010	978-812-03416-61
6	Workshop practice manual	K. Venkata Reddy, B. S. Publications, 6th Ed, 2015	978-8178-0030-78

E-References:

1. http://www.asnu.com.nu b.c.
2. http://wwwabmtools.com/downioads/Woodworking%20Carpentry%20Tools.pdf d.
3. http://www.weldingtechnology.org e.http://www.newagepublishers.com
4. http://wwwyoutube.com/watch?v=TeBX6cKKHWY g
5. http://wwwyoutube.com/watch?v=QHF0sNHnttw&feature=related h
6. http://www.youtube.com/watch?v= K v l zo9CAxt4&feature=relmfu i.
7. http://sourcing.indiamart.com/engineerig/articles/materials-used-hand-tools/

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

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

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
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	--

CO Vs PO and CO Vs PSO Mapping (Instrumentation)

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

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Shri. S. V. Joshi	Lecturer in Mechanical Engineering & I/c Workshop Superintendent	Govt. Polytechnic, Mumbai
2	Shri. N. M. Ambadekar	Workshop Superintendent,	Govt. Polytechnic, Thane
3	Shri. D. B. Jadhav	Senior Manager	Auto. Division, Mahindra and Mahindra Ltd., Kandivali

Coordinator
Curriculum Development,
Department of Mechanical Engineering

Workshop Superintendent
Department of Workshop

I/C, Curriculum Development Cell

Principal

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(Approved Copy)
CDC Co-ordinator
G. P. Mumbai

Programme : **Diploma in Civil Engineering (Sandwich Pattern)**									
Course Code:**CE19R101**			Course Title: **Construction Materials**						
Compulsory / Optional: **Compulsory**									
Teaching Scheme and Credits				Examination Scheme					
L	P	TU	Total	TH (2 Hrs 30 min)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
03	--	--	**03**	**60**	**20**	**20**	--	--	--	**100**

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	**Introduction :** 1.1 Scope of construction materials in Construction Technology, Transportation Engineering, Environmental Engineering, Irrigation Engineering. (Applicationsonly) 1.2 Selection of materials for different civil engineering structures on the basis of strength, durability, ecofriendly and economy. 1.3 Broad classification of materials – Sources, Natural, Artificial – special, finishing andrecycled. **Course Outcome: CO1Teaching Hours :4hrsMarks: 08(R-4, U-4, A-0)**

2	**Natural Construction Materials:** 2.1 Stone : Requirements of good building stone, characteristics, tools for stone 2.2 Timber : Structure, properties, seasoning,preservation, defects 2.3 Asphalt, bitumen and tar : properties,uses 2.4 Lime : types,uses 2.5 Soil : types, suitability inconstruction 2.6 Sand : properties, uses 2.7 Course aggregate : classification according to size ,uses **Course Outcome: CO2Teaching Hours : 12hrs Marks:14 (R-6, U-6, A-2)**
3	**Construction of Road Paveme Artificial Construction Materials :** 3.1Brick: Conventional/Traditional bricks, modular and standard bricks, characteristics, classification, field tests onbricks. 3.2 Flooring tiles : types,uses 3.3 Cement : types,uses 3.4 Pavement blocks, pre-cast concreteblock 3.5 Glass : soda lime glass, lead glass and borosilicate glassand theiruses 3.6 Plywood, particle board, veneers, laminated board andtheir uses 3.7 Ferrous and non-ferrous metals and theiruses ; **Course Outcome:CO2Teaching Hours :14hrsMarks:14(R-6, U-6, A-2)**
4	**Special Construction Materials:** 4.1 Waterproofing materials, Termite proofing materials, Thermal & Sound insulating materials : types, suitability in construction 4.2 Fibers : types – jute, glass, plastic asbestos fibers –uses 4.3 Geopolymer cement : properties,applications **Course Outcome:CO3 Teaching Hours : 6hrs Marks:08(R-4, U-4, A-0)**
5	**Finishing Materials :** 5.1 Plastering materials : lime mortar, cement mortar –uses 5.2 Plaster of Paris (POP) : constituents,uses 5.3 Paints : oil paints, distempers, varnishes-uses **Course Outcome:CO4 Teaching Hours :6hrs Marks:08(R-4, U-4, A-0)**
6	**Processed Construction Materials :** 6.1 Industrial waste materials : fly ash, blast furnace slag,granite, marble polishing waste – uses 6.2 Agro waste materials : Rice husk, bagasse, coir fibres –uses 6.3 Special processes construction materials :Geosynthetic, ferrocrete, artificial timber, artificial sand –uses **Course Outcome:CO5 Teaching Hours : 6hrs Marks: 08 (R-2, U-2, A-4)**

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
	Total	**26**	**26**	**08**	**60**

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., PH1 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/
3) http://civildigital.com
4) http://www.quora.com
5) http://www.nationallibrary.gov.in

CO VsPO and CO Vs PSOMapping

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	--

Industry Consultation Committee:

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1	Mr.RohanDeokar	Deputy Engineer	MMRDA
2	Mr.Sanjay Kulkarni	Surveyor and Consultant	SRKulkarniPvt.Firm

3	Mr. K.V. Kelgandre	Sr. Lecturer in Civil Engg.	K.J. Somaiya Polytechnic
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GOVERNMENT POLYTECHNIC MUMBAI
GPM
ESTD. 1960
MAKING KNOWLEDGE TO WORK

Programme : **Diploma in ME/CE/EE/CO/IF/IS/EC/RT/LT/LG (Sandwich Pattern), AIML**										
Course Code: UV19R101			Course Title: Universal Human Values-I							
Compulsory / Optional: Compulsory										
Teaching Scheme and Credits				Examination Scheme						
L	P	TU	Total (Credit)	TH (2 Hrs 30min)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
--	--	-	**02**	-	-	-	--	--	--	--

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 mid-term and second skill test at the end of the term.

Rationale:

Human beings have materially developed to a great extent through technological development. Still the scarcity of happiness and satisfaction result in personal and social conflicts. The value system develops the frame of reference of the individual to benchmark his/ her behavioral pattern respecting the righteousness during life. The appreciation and inculcation of a value system can develop a person as a creative contributor for society, nation and by-large the world.

By inculcating universal values, not only can a person resolve the personal, social and professional situations positively but also can lead toward an enriched life. Once these values are inculcated in a student's personality, it will result in the sustainable development of a student.

This course is designed to make the student think that by observing the universally accepted human values, it is easy to become a good human being, a good citizen and make their own life goal-oriented, cladded with happiness and satisfaction. The core universal values to be inculcated: personal values, social values and professional values. The aspirations and concerns to be explored at the level of individual, at the level of family, at the level of society and at the level of nature.

Course Outcomes: On completion of this course, student should be able to

CO1	Appreciate universal human values to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
CO2	Develop a holistic approach to environment, family and society.
CO3	Develop more confidence in self .
CO4	Derive joy of giving .
CO5	Improve understanding and perform acts of kindness.

Course Content Details:

Sr. No.	Activity	Related Value/s	Methodology of Implementation	Student's Role	Mentor's role	Resources Required
01	Prepare a self-introduction sheet i)Name, School passed from,achievements upto 10th standard • What are your goals in your life • What are your expectations from institute ,Family ,Society • Information of family members • Most happy moments and difficult moments in your life, Special trips, Hobbies , Sports, Music , etc	Honesty, Self-exploration	Preparing a note and presenting in front of peers	Thoughtfully answer the questions in an honest manner.	Provide information about the institute and motivate students to honestly express themselves.	Official website of the institute
02	List behavioral characteristics and analyse self, friend, family members, • Do you like these characters yes/no – why	Self-exploration, Honesty	Preparing a presentation	Honestly and sincerely analyse self and others	Create a stress-free environment and see that there will be no conflict of expression.	Provide a list of character traits by referring to various resources like internet, books, etc. For e.g. https://www.teachervision.com/writing/character-traits-list-examples

03	Identify your needs and desires	Honesty Self-exploration	Making a list of needs and desires	Reflect and identify needs and desires.	Stay wary of controversial subjects	list of historical personalities who set the example.
04	Singing a patriotic song in group • Make group , select song, explain meaning, use music/karaoke and demonstrate to class	Patriotism	Forming group of interested students Students will rehearse the activity and will perform in groups	Diligently practice and cooperate with others.	Manage the logistics of creating groups and assigning roles.	Music system, list of patriotic songs.
05	Essay writing • My dreams as an Engineer • India a Super power in my views • Society & I • Indian culture and values • My role models in life	Self – exploration Patriotism Accountability	Selecting a topic from the list and writing an essay on it	Thoughtfully write the essay on a selected topic.	Display the best essays on the notice board.	notice board, panel of judges
06	Play Music instruments/ Singing/ Drawing/Any stage performance/ photography/any creative art	Derive the joy	Present to peers (Two days competition)	Pursue your creative interest	Identify and categorize students. Create groups accordingly	logistical support
07	Visit a nature park, identify the flora & fauna, ecological factors & their role in our life. (e.g Maharashtra nature park society , Dharavi , Mumbai)	Environment Conservation	Students to arrange visit under supervision of mentor	Study various flora & fauna in a disciplined manner.	Assure safety of students and manage activities.	https://maharashtranaturepark.org/

08	Tree plantation and caring for it.	Environment Conservation	Students to arrange activity under supervision of mentor	Plant the appropriate saplings according to instructions.	Assure safety of students and provide adequate instructions	saplings, soil, shovels, fertilizer
09	List the distracters which are responsible to deviate you from integrity and find out the solution	Integrity, Righteousness	Observation and identification of common distracters.	Identify distracters like TV shows, movies and bad habits	Provide historical case studies of previous students.	Case studies
10	Prepare the chart DOs and DONTs for different situations like local trains, travel, public place, classroom, examination, etc.	Conscientiousness, honesty, social gratitude	Preparing the chart	Identify DOs and DONTs and prepare various charts	Create groups and assign topics.	Official websites of respective administrations like railways, Municipal corporation, etc.,
11	Beach cleaning, institute cleaning	Environment conservation, Health consciousness	Organizing a visit to clean the venue.	Clean the venue as per instructions.	Assure safety and aid in organization.	https://www.unitedwaymumbai.org/cleanshores

12	a)To prepare a first aid box to be kept at home b)Preparation of a report on industrial accident	Care for others, accountability	Collection of information from various available sources and use it for intended purpose.	a)Prepare a list of contents for a first aid box to be kept at home b) Prepare a first aid box as per prepared list c) Prepare a list of various accidental hazards at home. d) Prepare a display of safety precautions for use of gas stove. e) Collect information of one industrial accident , its effects, probable causes from various resources and prepare a report.	To explain and monitor the task	Medicine, Box, paper

Methodology:

1. The course is Non Examination, Credit Course.
2. The course will be introduced during the student induction programme (orientation programme). Most of the activities are to be completed during induction programme and to be continued throughout the term during SCA hours under the guidance of mentor.
3. The mentor will be assigned to the student for a group of 20 students each.
4. In consultation and under supervision of a mentor, the student/ Group of students has to complete the activity.
5. The mentor will work as a facilitator/ advisor.
6. The strategies to learn the course is "Self- Exploratory" and "Experiential Learning"
7. The onus of responsibility for completing the activities is with students.
8. The student has to complete at least **seven** no. of activities throughout the term to earn the credits.

References/ Books:

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria, Excel Books, New Delhi, 2010	978-8-174-46781-2
2	Human Values	A.N. Tripathy, New Age International Publishers, 2003	978-8-122-42589-5
3	Teacher's Manual - A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria, Excel Books, New Delhi, 2010	-
4	Science and Humanism, Towards a Unified World View	PL Dhar, RR Gaur, Commonwealth Publications, 1992	978-8-171-69222-4
5	Education for values in schools- a framework	NCERT	
6	Value oriented education	E N Gawande	

E-References:

1) https://youtu.be/kOJu1vj_BVk (The 10 MostImportant Human Values)
2) Dr. Prakash Baba Amte- Movie
3) https://youtu.be/QeogOlzG2ls (Value of Education -short film)

E-References for mentors:

1) https://www.edutopia.org/
2) https://sdgs.un.org/goals

Consultation Committee:

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1	Dr. L.A. Patil	Principal (Retired)	Pratap College, Amalner
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CE 19R102Libre Office Calc

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

Outline: Introduction to LibreOfficeCalc 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