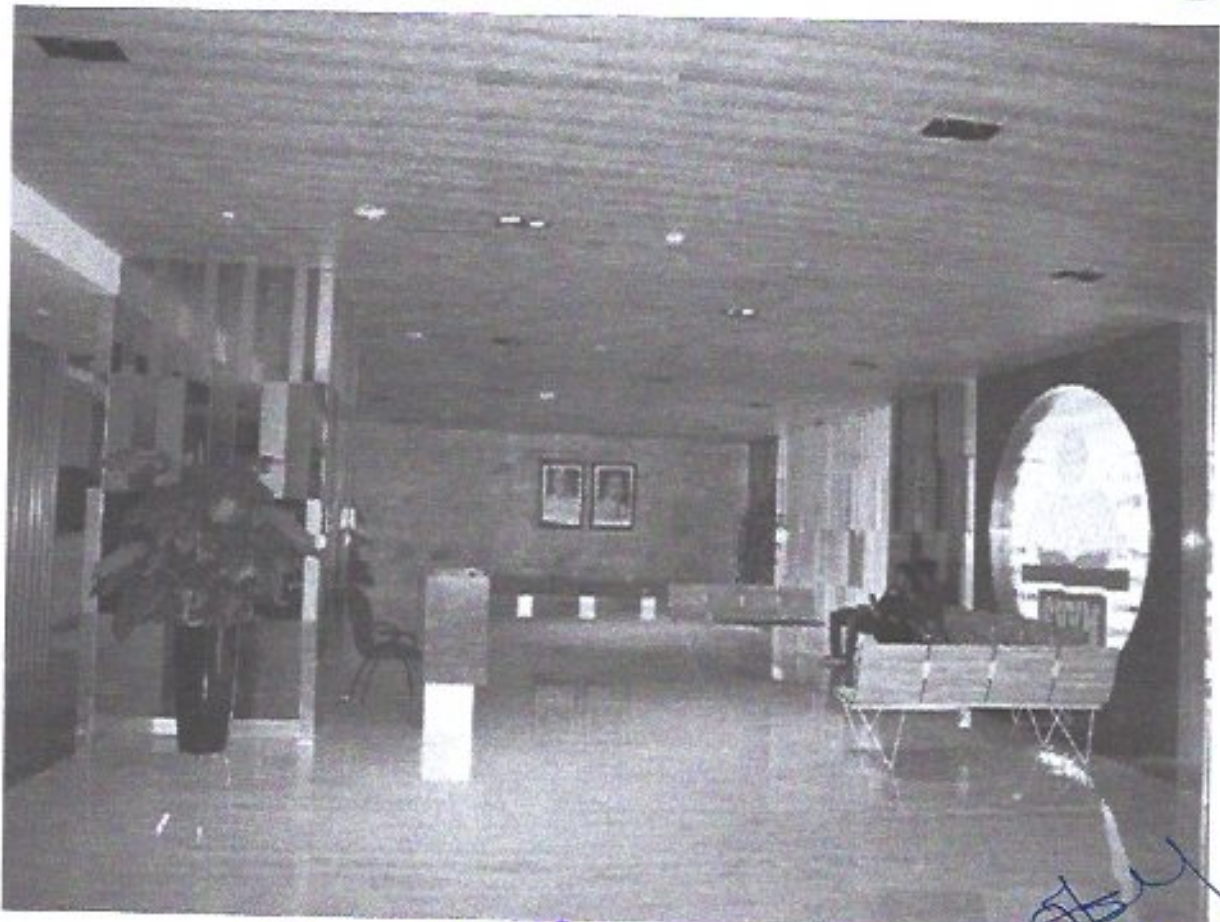




Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
Vile Parle (West), Mumbai-400 056



Department of
**ELECTRONICS AND TELECOMMUNICATIONS
ENGINEERING**
Three Years Full Time Diploma with Inplant Training
In
**ELECTRONICS AND TELECOMMUNICATIONS
ENGINEERING
CURRICULUM**
Semester Pattern
(Effective from June' 2020)



Shri Bhagubhai Mafatlal Polytechnic
Engineering Department
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Approved Copy
Curriculum Co-Ordinator / CGE

PRINCIPAL
Shri Bhagubhai Mafatlal Polytechnic
Vile-Parle (West), Mumbai-400 056.



Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Natakkar Ram Ganesh Gadkari Marg,

Vile Parle (West), Mumbai-400 056

Tel: 022- 4233 6000

Fax: (022) -2611 0117

Email: principalsbmp@rediffmail.com

Internet-URL: <http://sbmp.ac.in>



CURRICULUM

**THREE YEARS FULL TIME DIPLOMA COURSE
WITH INPLANT TRAINING
IN
ELECTRONICS AND TELECOMMUNICATIONS
ENGINEERING**

(Semester Pattern)

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Engineering Department
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

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Curriculum Co-Ordinator / COE

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PRINCIPAL
Shri Bhagubhai Mafatlal Polytechnic
Vile-Parle (West), Mumbai-400 056.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
NATAKKAR RAM GANESH GADKARI MARG
VILE PARLE (WEST), MUMBAI-400056
CURRICULUM
(Full Time 03 Year with Inplant Training)

**DIPLOMA COURSE IN
ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING**

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC started three years diploma courses and was affiliated to the Board of Technical Examinations, Maharashtra State, in 1963. Since 1969, academic freedom was granted to the Polytechnic, which enabled it to design the curriculum and examination scheme and to introduce inplant training, which involved industry-institute interaction. Thus, four years semester sandwich pattern came into existence. Since 1978-79, academic freedom was extended to all the full-time diploma courses. In 1989-90 full autonomy was granted to all the seven full-time diploma courses.

As a further development to the above, the Multi Point Entry and Credit System (MPECS) was initiated in 1981 on progressive basis. In this scheme students can regulate their pace of studies within the rules prescribed.

From 1993-94, full academic autonomy was extended to all the nineteen courses, which includes full-time diploma, part-time diploma and post-diploma courses. The students have to qualify for appearing in the final examinations as per details given in the MPECS rules. The examinations are conducted by the institute and the final diploma is awarded by the institute at the convocation function.

From the academic year 2016-17, our curriculum is revised and is converted to three-year diploma course. Teaching learning is done at the institute up to V semester and inplant training is offered at VI semester.

To incorporate the latest developments in technology and to have better industry institute interaction, the curriculum is revised again to be implemented from the academic year 2019-2020. This is a diploma course of three-year duration with inplant training in fifth semester.

The focus of Electronics and Telecommunications Engineering programme is to acquaint the students with advanced Telecommunications Technology and their applications. Analog and Digital Communication, Radar and Microwave, Fiber optic and Mobile communication are the key areas in which students are trained. The course on Electronic Equipment Maintenance is offered to give insight in servicing and maintenance aspect of the Electronics equipment. Overall the students of Electronics and Telecommunications Engineering after undergoing the programme will strengthen their knowledge in the field of Electronics and Telecommunications Engineering.

INPLANT TRAINING:

Students receive institutional training for the first four semesters and in sixth semester. In fifth semester, to gain practical knowledge and industrial exposure, they have to undergo inplant training. This scheme enables the students to enhance their psychomotor skills during the industrial training. The training also helps them to understand the different application-oriented courses in a better way and to develop need-based project, in sixth semester.



ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING PROGRAMME

VISION:

We aspire to develop technically skilled manpower in the field of Electronics and Telecommunications Engineering

MISSION:

M1: To design need-based curriculum.

M2: To provide advanced laboratory set-up

M3: To maintain industry-institute liaison

M4: To train faculty and staff to accept challenges in rapidly changing socio-technical environment

M5: To imbue students with soft skills, entrepreneurial qualities, ethics and lifelong learning

Program Educational Objectives:

PEO1: Apply the knowledge of science and mathematics in the field of Electronics and Telecommunications Engineering

PEO2: Demonstrate technical competence as a technician/supervisor in the field of Electronics and Telecommunications Engineering

PEO3: Be a professional leader in multidisciplinary domain

PEO4: Be a life-long learner

PROGRAMME SPECIFIC OBJECTIVES:

PSO1: To develop expertise in Analog and Digital Communication

PSO2: To service and maintain Electronics and Telecommunications Equipment



Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

PROGRAMME: ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING
SEMESTER: I

With effect from batch admitted June' 2020(Progressively)
Duration: 16 Weeks

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
1	Basic Mathematics (BMT190001)	3	-	-	2	5	3	70	20	10	70	25	-	-	125	B*	325
2	Applied Physics (APH190010)	4	2	-	-	6	1	@70	20	10	70	25	50	-	175	B*	426
3	Environmental Studies (EVS190003)	2	-	-	-	2	-	-	-	-	-	50	-	-	50	B*	202
4	Communication Skills (CMS190011)	3	-	-	1	4	3	70	20	10	70	25	-	-	125	B*	314
5	Engineering Drawing (EDG190007)	2	2	2	-	6	-	-	-	-	-	50	50	-	100	C*	246
6	C Programming (CPR190019)	2	4	-	-	6	-	-	-	-	-	50	50	-	100	C*	246
7	Electronic Materials Components and Devices (EMC194701)	3	2	-	-	5	3	70	20	10	70	25	-	50	175	C*	325
TOTAL		19	10	2	3	34	No. of Papers=4		80	40	280	250	150	50	850		19/15/34
TOTAL PERIODS = 34										TOTAL MARKS = 850							

Theory and practical periods of 1 Hour duration each

* Compulsory, # Award Winning, @Online Examination

L- Lecture, P- Practical, D- Drawing Practice, T- Tutorial, Cr- Credit, ESE- End Semester Examination, SSL- Sessional, TA- Teachers assessment, TH- Theory,

TW- Term Work, PR- Practical, OR- Oral, Gr- Group, B - Basic, C - Core, A - Application, M - Management

TA- Based on attendance, MCQ/ seminar/mini project/assignment/model making etc.

PR/OR- Assessed by Internal and External Examiners Jointly, TW- Assessed by Internal Examiner Only

Anika
Head of Department

Asin
Controller of Examination

Shamika
Secretary CDC



[Signature]
Principal

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

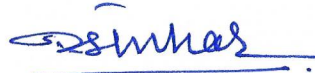
PROGRAMME: ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING
SEMESTER: II

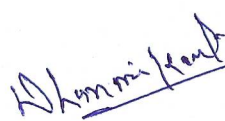
With effect from batch admitted June' 2021(Progressively)
Duration: 16 Weeks

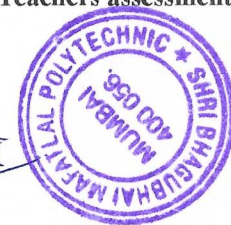
Sr. No	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks							Gr	Scheme L/P/Cr	
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL			
1	Engineering Mathematics (EMT190009)	3	-	-	2	5	3	70	20	10	70	25	-	-	125	B*	325	
2	Applied Chemistry (ACH190002)	4	2	-		6	1	@70	20	10	70	25	50	-	175	B*	426	
3	Development of Life Skills (DLS190004)	2	-	-	1	3	-	-	-	-	-	50	-	50	100	B*	213	
4	Workshop Practice(EX) (WSP191001)	-	4	-	-	4	-	-	-	-	-	50	-	-	50	B*	044	
5	Elements of Electrical Engineering (EEE194703)	3	2	-	-	5	3	70	20	10	70	25	50	-	175	C*	325	
6	Electronic Devices & Circuits-I (EDC194704)	4	2	-	-	6	3	70	20	10	70	25	50	-	175	C*	426	
7	Principles of Digital Techniques (PDT194705)	3	2	-	-	5	3	70	20	10	70	25	50	-	175	C*	325	
TOTAL		19	12	-	3	34	No. of Papers=5		100	50	350	225	200	50	975		19/15/34	
TOTAL PERIODS = 34										TOTAL MARKS = 975								

Theory and practical periods of 1 Hour duration each * Compulsory, # Award Winning, @Online Examination
L- Lecture, P- Practical, D-Drawing Practice, T- Tutorial, Cr- Credit, ESE-End Semester Examination, SSL- Sessional, TA-Teachers assessment, TH-Theory, TW- Term Work, PR- Practical, OR- Oral, Gr- Group, B - Basic, C - Core, A - Application, M - Management
TA- Based on attendance, MCQ/ seminar/mini project/assignment/model making etc.
PR/OR- Assessed by Internal and External Examiners Jointly, TW- Assessed by Internal Examiner Only


Head of Department


Controller of Examination


Secretary CDC




Principal

1. COURSE DETAILS

Programme: CE/ME/EE/TE/PL/CH/DE/EXTC	Semester: 1
Course: Basic Mathematics	Group: B*
Course Code: BMT190001	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	-	-	2	5	3	70	20	10	70	25	-	-	125

3. COURSE OBJECTIVE:

This Course is being introduced to provide mathematical background needed for any Diploma engineer. It intends to enable the students to apply basic facts, concepts and principles of algebra, trigonometry, Determinants, Matrices, functions and Limits as a tool to analyze engineering problems.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified

Competency through various teaching learning experiences:

- Solve broad-based Engineering problems using the Basic Knowledge of mathematics



5. COURSE OUTCOMES (COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	Apply the concepts of algebra to solve engineering related problems.	R, U
2	Utilize basic concepts of trigonometry to solve elementary engineering problems.	R,U,A
3	Solve problems based on Determinants and Matrices.	U,A
4	Study the concept of function and limits and apply them into engineering	R,U,A

6. COURSE CONTENTS

Sr No.	TOPIC Sub-Topics	Hours	Marks	Cos
1	Logarithm 1.1 Concept 1.2 Basic Laws of logarithm (without proof) 1.3 Numerical on Change of Base (without proof)	03	04	CO1
2	Partial Fraction 2.1 Introduction: Proper and improper fractions 2.2 Type 1: Non-repeated linear factor 2.3 Type 2: Repeated linear factor 2.4 Type 3: Irreducible quadratic form 2.5 Examples using Substitution	04	07	CO1

3	Straight Lines 3.1 Revision: Slope of straight lines 3.2 Revision: Various form of Straight lines 3.3 General equation of line and its relation to standard form 3.4 Angle between two lines 3.5 Condition of parallel and perpendicular lines 3.6 Perpendicular distance from a point on the line 3.7 Perpendicular distance between two parallel lines.	05	09	CO1
4	Trigonometry 4.1 Revision of Trigonometry Formulas 4.2 Trigonometric ratios of Compound, allied, multiple and sub-multiple angles (without proofs) 4.3 Factorization and de-factorization formulae (without proofs) 4.4 Inverse Trigonometric function 4.5 Principle values and Relation between Trigonometric and Inverse Trigonometric function.	12	15	CO2
5	Determinants & Matrices 5.1 Revision: Determinants of 2 x 2 order 5.2 Value of Determinants of 3 x 3 order 5.3 Cramer's rule to solve three unknowns 5.4 Introduction to Matrices 5.5 Algebra of Matrices 5.6 Transpose, Adjoint and Inverse of Matrices 5.7 Solution of simultaneous equation by Matrix inversion method. (2 and 3)	12	18	CO 3
6	Function 6.1 Introduction and Definition 6.2 Simple Numerical based on concept of function 6.3 Odd and Even Functions	04	07	CO 4
7	Limits 7.1 Introduction and Definition 7.2 Concepts of limits 7.3 Limits of algebraic, trigonometric, exponential and logarithmic functions	08	10	CO 4
Total		48	70	

7. LIST OF ASSIGNMENTS/TUTORIALS

Term Work consists of Journal containing minimum no of 12 tutorials.

Sr. No.	Title of Tutorial	Approx.Hrs required	COs
1	Assignments on Logarithms based on laws and change of base.	2	1
2	Assignments on partial fraction (Non-repeated and repeated linear factor)	2	1
3	Assignments on partial fraction (Irreducible quadratic form and using Substitution)	2	1
4	Assignments on straight lines. (General equation of line and Angle between two lines)	2	1
5	Assignments on straight lines. (Condition of parallel and perpendicular lines Perpendicular distance from a point on the line Perpendicular distance between two parallel lines.)	2	
6	Assignments on trigonometric. (Trigonometric ratios of Compound, allied, multiple and sub-multiple angles. Factorization and de-factorization formulae.)	4	2
7	Assignments on trigonometric. (Inverse Trigonometric function)	2	2
8	Assignments on Determinates. (Basic solving and Cramer's rule)	2	3

9	Assignments on matrices. (Algebra of Matrices ,Transpose, Adjoint and Inverse of Matrices)	2	3
10	Assignments on matrices. (solving equations using matrix method)	2	3
11	Practicing matrices and on Matlab.	4	3
12	Assignments on function. (Types of functions)	2	4
13	Assignments on Limits. (Limits of algebraic, trigonometric, exponential and logarithmic functions)	4	4
	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Assignments
3. Home Work Assignment

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Basic Mathematics	Shri. B.M. Patel, Shri J.M. Rawal	Nirali Prakashan Mumbai
2.	Calculus for Polytechnics	Shri. S.P.Deshpande	Pune Vidyarthi Graha Prakashan Pune-30
3.	Higher Engineering Mathematics	Dr. B.S. Grewal	Khanna Publishers 2/B, Delhi-6
4	Basic Mathematics	G.V.Kumbhojkar	P.Jamnadas LLP

10. WEB REFERENCES

1. www.mic-mathematics.com
2. www.math.com
3. www.lenerstv.com
4. www.onlinetutorials.com

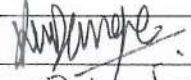
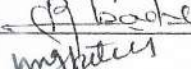
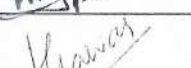
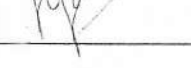
11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Logarithm	2	2		04
2	Partial Fraction	3	4		07
3	Straight Lines	2	5	2	09
4	Trigonometry	3	5	7	15
5	Determinates & Matrices	3	12	3	18
6	Function	2	3	2	07
7	Limits	3	4	3	10
	TOTAL	18	35	17	70

R Remembering, U Understanding, A Applying and Above (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.



Sr. No.		NAME	SIGNATURE
1	Internal	MS.Kavita.K.Dange	
2	Internal	Mr.R.R.Ambade	
3	Internal	Mr.U.J.Patel	
4	External	Ms.Meena Gawas Organisation: Mithibai College Of Arts and Science	



1. COURSE DETAILS

Programme: CE/ME/EE/TE/PL/CH/DE/EXTC	Semester: I / II
Course: APPLIED PHYSICS	Group: B*
Course Code:APII90010	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs	Tutorial Hrs	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	1	@70	20	10	70	25	50	-	175

3. COURSE OBJECTIVE

Diploma engineers have to deal with various materials, instruments and machines. This course is designed with some fundamental information to help the diploma engineers apply the basic concepts and principles of physics to solve broad based engineering problems. The study of basic principles of physics and the concepts related to properties of materials, heat, acoustics, electricity, magnetism, optics, semiconductors help in understanding the engineering courses where emphasis is on the applications of these in engineering.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Solve broad-based engineering problems applying basic concepts and principles of physics.

5. COURSE OUTCOMES:

CO No.	COURSE OUTCOME	BLOOM'S LEVEL
1	Estimate errors in measurement of physical quantities.	Understand, Application
2	List the use of physical properties of different materials.	Remembering
3	Use the basic principles of elasticity, surface tension, viscosity, heat and optics in related engineering applications.	Understanding
4	Apply the principles and concepts of electricity, magnetism, sound to solve engineering problems.	Application



6. COURSE CONTENT:

Sr.No	Topic/Sub-topic	Hours	Marks	COs
1.0	1. Measurement and errors 1.1 Fundamental, Derived, Supplementary SI units. 1.2 Accuracy and Precision in Measurement. 1.3 Significant figures in measured quantities. 1.4 Basic Measuring instruments-Vernier Caliper, 1.5 Micrometer screw gauge, spherometer, ammeter, Voltmeter with their least count, range, accuracy and precision.	04	04	CO1
2.0	2. Properties of matter : Elasticity , Surface Tension 2.1 Elasticity : 2.1.1 Deforming force, restoring force, elastic and plastic body. 2.1.2 Stress and strain with their types. 2.1.3 Elastic limit, Hooke's law. 2.1.4 Moduli of elasticity. 2.1.5 Stress-strain diagram, behaviour of wire under continuously increasing load. 2.1.6 Definition of yield point, ultimate stress, factor of safety. 2.1.7 Numerical on stress, strain and Young's modulus. 2.2 Surface Tension : 2.2.1 Molecular force, cohesive and adhesive force, molecular range, sphere of influence. 2.2.2 Definition of surface tension and its S.I. unit, angle of contact. 2.2.3 Capillary action with examples, shape of meniscus for water and mercury. 2.2.4 Relation between surface tension, capillary rise and radius of capillary (no derivation). 2.2.5 Effect of impurity and temperature on surface tension, 2.2.6 Numerical on relation between surface tension, capillary rise and radius. 2.3 Viscosity : 2.3.1 Fluid friction, viscous force. 2.3.2 Definition of viscosity, velocity gradient. 2.3.3 Newton's law of viscosity, Definition coefficient of viscosity and its S.I. unit. 2.3.4 Streamline and turbulent flow with examples, critical velocity. 2.3.5 Variation of viscosity with temperature. 2.3.6 Reynolds number and its significance.	11	13	CO 1 CO2 CO3



3.0	3. Heat and Temperature 3.1 Heat : 3.1.1 Conduction, convection and radiation, good and bad conductor of heat with examples. 3.1.2 Law of thermal conductivity, coefficient of thermal conductivity and its S.I. unit. 3.1.3 Definition of linear, areal and cubical expansion and relation between them (no derivation) 3.2 Temperature : 3.2.1 Boyle's law, Charle's law, Gay Lussac's law. 3.2.2 Absolute zero temperature, Kelvin scale of temperature, general gas equation(statement only). 3.2.3 Effect of temperature on physical parameter, specific heat of gas at constant pressure and volume (C_p and C_v), the three gas laws, determination of specific heats of different materials. 3.2.4 Temperature measurement : Optical pyrometer, Thermoelectric thermometer	05	06	CO1 CO2 CO3
4.0	4. Sound , ultrasonic and acoustics 4.1 Simple Harmonic Motion : 4.1.1 Uniform circular motion motion, periodic, Vibrational motion (definition with examples), 4.1.2 Simple Harmonic Motion (S.H.M.) (Definition) 4.1.3 Characteristics of S.H.M. 4.1.4 Amplitude, Frequency, Period of S.H.M. 4.1.5 General equations of (S.H.M.) (no derivation) 4.1.6 Graphical representation of S.H.M. (only diagram). 4.1.7 Phase of S.H.M., Epoch or phase constant of S.H.M. (definition). 4.1.8 Numerical on amplitude, frequency and period of S.H.M. 4.2 Wave Motion 4.2.1 Definition of Wave motion, amplitude, period, frequency and wavelength. 4.2.2 Relation between velocity, frequency, and wavelength. 4.2.3 Equation of progressive wave (no derivation). 4.2.4 Longitudinal and transverse wave. 4.2.5 Definition and formation of stationary wave. 4.2.6 Definition of Node, Antinode, Free vibration, Forced vibration and Resonance. 4.2.7 Velocity of sound by resonance tube. 4.2.8 Frequency of A.C. Supply by Sonometer. 4.2.9 Numerical on relation $v = n\lambda$ and resonance. 4.3 Acoustics and Reverberation : 4.3.1 Definition of Echo, Reverberation, Reverberation time. 4.3.2 Sabine's formula (no derivation). 4.3.3 Definition of Absorption coefficient, Open window unit (OWU), Absorption coefficient	10	12	CO1 CO2 CO4



5.0	<p>5.OPTICS</p> <p>5.1 Photoelectric effect :</p> <p>5.1.1 Statement of photoelectric effect, Planck's hypotheses, Einstein's equation.</p> <p>5.1.2 Definition: Threshold wavelength, Threshold frequency, Work function.</p> <p>5.1.3 Study of experimental set up for study of photoelectric effect, Study of factors on which photoelectric effect depend on. Definition: Stopping potential.</p> <p>5.1.4 Characteristics of photoelectric effect.</p> <p>5.1.5 Photocells: Photo emissive, photoconductive, photovoltaic.</p> <p>5.1.6 Engineering applications.</p> <p>5.1.7 Numerical on energy of photon, work function, Einstein's equation.</p> <p>5.2 Interference :</p> <p>5.1Interference of light, Interference pattern. Constructive interference, Destructive interference. Steady interference of light.</p> <p>5.2.2Conditions for steady interference pattern</p> <p>5.2.3 Newton's rings, Newton's rings setup, Wavelength of source of light (No derivation)</p> <p>5.2.4Optical flatness, Engineering Applications Fiber optics Total internal reflection, optical fiber-step index and graded index, Applications.</p> <p>5.3 Diffraction :</p> <p>5.3.1 Diffraction of light, Diffraction at a slit,</p> <p>5.3.2 Diffraction Grating, Characteristics of grating spectra.</p> <p>5.4 Polarization :</p> <p>5.4.1 Polarization of light, Definition : Plane of polarization, plane of vibration</p> <p>5.4.2 Explanation of polarization of light, Nicol prism.</p> <p>5.4 X-rays :</p> <p>5.4.1 Production of X-rays, types of X-ray spectra-continuous and characteristics,</p> <p>5.4.2 X-ray wavelength (simple Problems), properties of X-rays.</p> <p>5.4.3 Applications of X-rays.</p>	11	11	CO 1 CO 2 CO 3
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6.0	<p>6.0 ELECTRICITY AND MAGNETISM</p> <p>6.1 Coulomb's law , Intensity and Potential :</p> <p>6.1.1 Coulomb's inverse square law for electric charges, Electric fields, Intensity of electric field.</p> <p>6.1.2 Electric line of forces, Properties of electric line of forces.</p> <p>6.1.3 Electric flux, Electric flux density, Relation between flux density and Intensity of electric field.</p> <p>6.1.4 Electric potential, Absolute electric potential.</p> <p>Numerical problems.</p> <p>6.2 Capacitor :</p> <p>6.2.1 Capacity of conductor, Definition: Capacitance, Farad.</p> <p>6.2.2 Capacitance of Spherical conductor, Principle of capacitor (condenser).</p> <p>6.2.3 Capacitors in series and parallel, Expression for the energy stored,</p> <p>6.2.4 Numerical on capacitor.</p> <p>6.3 Current electricity :</p> <p>6.3.1 Ohm's law, Resistance, Specific resistance, Combination of resistances, e.m.f. and p.d., Temperature coefficient of resistance. Potentiometer , Applications , Numerical problems on specific resistances .</p> <p>6.4 Magnetic materials :</p> <p>6.4.1 Modern concepts of magnetism, Dia, Para, Ferromagnetism,</p> <p>6.4.2 Testing of magnetic materials , Current carrying conductor in magnetic field,</p> <p>6.4.3 Shunt, Moving coil galvanometer.</p>	10	10	CO 1 CO 2 CO 4
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7.0	7. MODERN PHYSICS 7.1 Crystal Structure 7.1.1 Space lattice, Unit cell, Cubic Crystal Structures- Simple cubic,(S.C.), Body centered cubic(B.C.C.), Face centered cubic(F.C.C.). 7.1.2 Number of atoms per unit cell, Atomic radius, Co-ordination number, Packing density. 7.1.3 Atomic planes and spacing, Miller indices. 7.3 Lasers : 7.3.1 Elementary idea, Spontaneous and Stimulated emissions, population inversion, pumping methods, Helium-neon laser construction and working, Ruby laser. 7.3.2 Elementary idea, Spontaneous and Stimulated emissions, Ruby laser, Helium-neon laser.	10	10	CO 3 CO 4
8.0	8.0 SUPERCONDUCTIVITY AND NANOTECHNOLOGY 8.1 Super conductivity : 8.1.1 Principle of superconductivity, zero ohmic resistance, Meissner effect. 8.1.2 Properties and Applications. 8.2 Nanotechnology : 8.2.1 Nano – Technology, Nano – science, Nano – materials, Nano – machines. 8.2.2 Instruments being used in Nano – technology, Five generation of Nano – technology, Carbon allotropes, Applications.	03	04	CO 2
		64	70	

7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum no of 10 experiments and 03 Demonstrations.

Sr. No.	Title of experiment/Assignments/Tutorials/Drawings/Demonstrations	Appr.Hrs required	COs
1.	Use of Measuring Instruments – Vernier Callipers, Micrometer Screw Gauge , Spherometer.	2	CO1
2.	Young's Modulus by Searle's Apparatus.	2	CO2
3.	Surface tension by Capillary rise method.	2	CO2
4.	Viscosity by Poiseuille's method.	2	CO2
5.	Thermal conductivity of a good conductor by Searle's Apparatus.	2	CO2
6.	Velocity of sound by Resonance.	2	CO2
7.	Frequency of A.C. Supply by Sonometer .	2	CO4
8.	Wavelength of Light by Diffraction Grating.	2	CO3
9.	'J 'by Electrical Method.	2	CO1
10.	Wavelength of Laser Beam (He – Ne) by Diffraction Grating.	2	CO4
11.	Wavelength of Light by Diffraction Grating.	2	CO4
12.	Study of Crystal Structure.	2	CO2
13.	Use of Potentiometer (Principle, Comparison of e.m.f.s of Cell, Calibration of Voltmeter).	2	CO1,CO4
14.	Use of Wheatstone's bridge (Resistance, Specific resistance).	2	CO1,CO4
15.	Study of Spectrometer (Minimum Deviation and Refractive Index.	2	CO3



Demonstrations			
(i)	Use of Precision Measuring Instruments (Dial Vernier , Dial Micrometer , Travelling Microscope etc.)	1	CO1
(ii)	Temperature of Flame (Optical Pyrometer)	1	CO2
(iii)	Spectra of Ionized Gases.	1	CO2
(iv)	Study of Photocell.	1	CO3
(v)	Study of Newton's Rings.	1	CO3
(vi)	Study of Para and Diamagnetism by Electromagnet.	1	CO3

8.0 IMPLEMENTATION STRATEGY:

- (i) Teaching Plan
- (ii) Minimum number of Practical.
- (iii) Demonstrations
- (iv) Guest lecture

9.0 LEARNING RESOURCES:

Sr. No.	Title Of Book	Author	Publication
1.	Engineering Physics	R.K. Gaur and S.L. Gupta	Dhanpat Rai Publishing Co. New Delhi
2.	Physics for Engineers	M.R. Shrinivasan	New Age International , New Delhi
3.	A Text Book of Engineering Physics	P.G.Kshirsagar and M.N.Avandhunulu	S. CNHAND & CO. LTD.
4	Introductory Physics – Volume 1,2 & 3	Gambhir, Durgapal and Banerji	Wiley Eastern

10.WEB REFERENCES

1. [http://www.books.google.co.in/books/physics Dummies by Steven Holzner](http://www.books.google.co.in/books/physics%20Dummies%20by%20Steven%20Holzner), <http://www.hypertextbook.com/physics>, <http://www.google.co.in/search?=physics>, <http://www.physics.ucsc.edu/~josh/6A/mechanics-e-books>
2. 2.1 Elasticity : <http://www.hyperphysics.phy-astr.gsu.edu/hbase/permot2.html>, <http://www.youtube.com/watch?v=Ejn6Fytn15Y>
- 2.2 Surface Tension : <http://www.hyperphysics.phy-astr.gsu.edu/hbase/surten.html>, <http://www.youtube.com/watch?v=wOOY1szbcX4>
- 2.3 Viscosity : [http://www.books.google.co.in/books/physics Dummies by Steven Holzner](http://www.books.google.co.in/books/physics%20Dummies%20by%20Steven%20Holzner), <http://www.hypertextbook.com/physics>, <http://www.wiley.com/college/cutnell>, <http://www.google.co.in/search?=physics>
3. . Heat and Temperature : <http://www.google.co.in/search?=physics> , <http://www.hypertextbook.com/physics>
4. SOUND , ULTRASONIC AND ACOUSTICS : <http://www.google.co.in/search?=physics> , <http://www.hypertextbook.com/physics>, <http://en.wikipedia.org/wiki/Simpleharmonic> motion. <http://www.youtube.com/watch?v=SBC0C8pa2VU>, <http://www.hyperphysics.phy-astr.gsu.edu/hbase/sound/>



[wavplt.html](#), www.tutorvista.com/content/physics/physics-iii/waves/stationary-waves.php,
http://www.youtube.com/watch?v=v_Ne17Y1h7I

5. OPTICS:

<http://www.hypertextbook.com/physics>, <http://www.google.co.in/search?=&physics>, <http://www.hyperphysics.phy-astr.gsu.edu/hbase/relative/photel.htm>, www.newton.dep.anl.gov/askasci/phy05/phy05070.htm, <http://www.hyperphysics.phy-astr.gsu.edu/hbase/quantum/hydfin.html>, <http://www.youtube.com/watch?v=0CdXidwO8LM>

6. ELECTRICITY AND MAGNETISM:

<http://www.hypertextbook.com/physics>, <http://www.wiley.com/college/cutnell>, <http://www.google.co.in/search?=&physics>,
<http://www.biomed.exactatign.com/topic/environment/energy/electricity/electromagnetics>,
http://www.books.google.co.in/books/physics_Dummies_by_Steven_Holzner, <http://www.physics.ucsc.edu/~josh/6A/mechanics-e-books>

7.0 MODERN PHYSICS :

<http://www.hypertextbook.com/physics>, <http://www.google.co.in/search?=&physics>, <http://www.hyperphysics.phy-astr.gsu.edu/hbase/relative/photel.htm>, www.newton.dep.anl.gov/askasci/phy05/phy05070.htm, <http://www.hyperphysics.phy-astr.gsu.edu/hbase/quantum/hydfin.html>, <http://www.youtube.com/watch?v=0CdXidwO8LM>,
<http://www.hyperphysics.phy-astr.gsu.edu/hbase/soilds/fermi.html>, http://www.electronics-tutorials.ws/diode/diode_1.html,

8. SUPERCONDUCTIVITY AND NANOTECHNOLOGY:

<http://www.hypertextbook.com/physics>, <http://www.google.co.in/search?=&physics>,

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN:

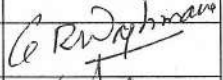
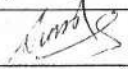
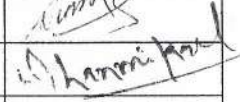
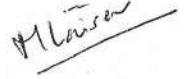
Sr.No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	MEASUREMENT AND ERRORS	2	1	1	04
2.	PROPERTIES OF MATTER : ELASTICITY , SURFACE TENSION	6	4	3	13
3.	HEAT AND TEMPERATURE.	2	2	2	06
4.	SOUND , ULTRASONIC AND ACOUSTICS	4	4	4	12
5.	OPTICS	4	4	3	11
6.	ELECTRICITY AND MAGNETISM	3	4	3	10
7.	MODERN PHYSICS	4	3	3	10
8.	SUPERCONDUCTIVITY AND NANOTECHNOLOGY	1	2	1	04
TOTAL		21	27	22	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.



12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	MR. G.R. WAGHMARE	
2	Internal	MR. S.S. SALVE	
3	Internal	MR. L.B. DESHPANDE	
4	External	Mr. M. B. JAISWAR Organization: Shri T.P. Bhatia Jr. College, Kandivali (W)	



1. COURSE DETAILS

Programme:CE/ME/EE/IE/PE/CH/DE/EXTC	Semester: I
Course: Environmental Studies	Group : B*
Course Code:EVS190003	Duration :16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
2	--	--	--	2	--	--	--	--	--	50	--	--	50

3. COURSE OBJECTIVE

Environmental Sciences is a multidisciplinary course aimed to impart knowledge about the current situation and future prospects of nature and natural resources. It is designed to create awareness of ecosystems of the world, earth's resources –renewable and non-renewable, health benefits of nature and adverse effects with depletion of environment. Such a knowledge can encourage today's generation to switch to safer and better choices.

Environmental education makes people understand the importance of renewable energy. Nonrenewable sources of energy like petrol, diesel etc. are the major sources of the world's pollution. Using renewable sources like *solar energy, wind energy etc* is encouraged by Environment Education, and is imperative in our fight against global warming.

4.SKILL COMPETENCY

Following skills and competency will be developed

- Sense of social responsibility.
- Communication and analytical skills.
- Ability to apply knowledge and skills in real-world settings.
- Competence in developing arguments from scientific, ethical and philosophical perspective.



5. COURSE OUTCOMES (COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Identify and classify different natural resources and use them prudently.	Remember
CO2	Recognize and categorize the different ecosystems.	Remember
CO3	Estimate the importance of biodiversity and its conservation.	Remember, Understand
CO4	Judge the type of pollution, identify the pollutants and propose and design methods to reduce the same.	Remember, Understand
CO5	Use the information regarding environmental legislation to improve upon their surroundings for the betterment of the community.	Remember, Apply

6.COURSE CONTENT

Sr. No.	TOPIC/ Sub-Topics	Hours	Marks	CO
1	1. The Multidisciplinary nature of environmental studies: 1.1 Definition, scope and importance 1.2 Need for public awareness	03	--	CO5
2	2. Natural Resources: Renewable and non-renewable resources: 2.1 Natural resources and associated problems 2.2 Forest resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forest and tribal people. 2.3 Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams' benefits and problems. 2.4 Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. 2.5 Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. 2.6 Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. 2.7 Energy resources: 2.7.1 Renewable Energy Resources – Biogas, Solar energy, Wind energy, Energy from falling water, Energy from wastes and tidal energy. 2.7.2 Non-Renewable Energy Resources – Coal, Oil, Natural gas Issue of economic viability and ability to meet demands. Inequitable use of energy in urban and rural areas	10	--	CO1
3	3. Eco Systems: 3.1 Concept of ecosystem 3.2 Major ecosystems in the world	03	--	CO2
4	4. Biodiversity and Its Conservation 4.1 Concepts 4.2 Threats to biodiversity 4.3 Value and conservation of biodiversity	02	--	CO3
5	5. Environmental Pollution 5.1 Definition Causes, effects and control measures of 5.2 Air pollution 5.3 Water pollution 5.4 Soil pollution 5.5 Noise pollution	07	--	CO4



6	6. Social issues and the Environment 6.1 Types of wastes – generation, characteristics, treatment and disposal of: 6.2 Solid waste 6.3 e- waste 6.4 Biomedical waste 6.5 From Unsustainable to Sustainable development 6.6 Water conservation, rain water harvesting, watershed management 6.7 Environmental ethics: Issues and possible solutions like Carbon Credit. 6.8 Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.	05	--	CO5
7	7. Environmental Protection 7.1 Environment legislations- 7.2 Legal aspects related to environment 7.3 Brief description of various acts involving air, water and forests. 7.4 ISO-14000 7.5 Issues involved in enforcement of environmental legislation	02	--	CO5
TOTAL		32		

7. LIST OF ASSIGNMENTS

Term Work consists of Journal containing minimum no of 05 Home assignments

Sr. No.	Title of Assignment	COs
1	Write a note on different renewable sources of energy.	CO1,CO3
2	List any two man-made disasters. Analyse their causes and effects on environment.	CO5
3	Analyse the problem of water scarcity and water management in India. Suggest a suitable solution for the same.	CO1
4	Describe one endangered species and measures to protect it.	CO2,CO4,CO5
5	Collect data regarding quality of air in different parts of the city. Analyse and draw conclusion about air pollution in the city.(Group Project)	CO4

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Assignment
3. Group discussion
4. Case Study
5. Self-Learning Online Resources
6. Visit to a waste treatment plant



9. LEARNING RESOURCES

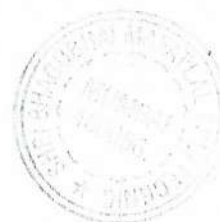
Sr. No.	Title Of Book	Author	Publication
1.	Text book of Environmental studies	Erach Bharucha	UGC Press
2.	Environmental studies	Rajagopalan	Oxford University Press
3	Environmental studies	Anandita Basak	Drling Kindersley(India) Pvt. Ltd Pearson
4	Fundamental concepts in Environmental studies	D.D. Mishra	S. Chand & Co. Ltd.
5	Role of Tech. in Environment and Health	Jain and Jain	Dhanpat Rai Publishing Co. New Delhi

10. WEB REFERENCES

- <https://study.com/academy/.../what-are-natural-resources-definition-lesson->
- www.yourarticlelibrary.com/biodiversity/biodiversity...ecological-diversity/4474
- <https://www.britannica.com/science/pollution-environment>
- <https://businessworld.in/article/Major-Environmental-Laws-Of-India/09-09-2017-125737>

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	S.V.Suvarna	<i>[Signature]</i>
2	Internal	K.P.Bhave	<i>[Signature]</i>
3	Internal	R.D.Shimpi	<i>[Signature]</i>
4	External	<i>Dr. S. Arni</i>	<i>[Signature]</i>
		Organaisation: <i>Mucckala Polytechnic Thane</i>	



1. COURSE DETAILS: Communication Skills

Program: CE/ME/ EE/IE/PE/CH/DE/EXTC	Semester: I/II
Course: Communication Skills	Group: B*
Course Code: CMS190011	Duration: 16Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								Gr	Scheme L/P/Cr	
Theory Hrs	Practical Hrs	Drawing Hrs	Tutorial Hrs	Credits (L+P+D+T)	Theory Paper Duration and Marks		SSL	TA	Theory	TWK	PR	OR			Total
					Hours	Mark									
03	-	-	01	04	03	70	20	10	100	25	-	-	125	B*	314

3. COURSE OBJECTIVE: The communicative competence in English is the pre-requisite for the employment market at national and international level today. However, the ability to communicate effectively does not come easily to many people. No matter how brilliant and invaluable your idea is, it is worthless until shared either orally or in written manner. Here arises the need to learn communication skills which will enable the students to enhance their comprehension, writing and oral skills in English.

4. SKILL COMPETENCY: Students will be able to develop the following skills / competencies.

1. Interpersonal skills
2. Listening and Reading skills
3. Formal Writing skills
4. Pronunciation and Speaking
5. Usage of Grammar and Vocabulary



5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOMES	Bloom's Level
CO1	Define communication with its types and understand the Process of communication.	Remember
CO 2	Apply the various grammatical structures which will enhance oral and written communication.	Application
CO 3	Demonstrate the proficiency in language skills (L.S.R.W.) by using language lab.	Understand
CO 4	Draft various types of written communication eg. Letter, circular, notices for personal and professional use.	Application

6. COURSE CONTENTS:

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	COMMUNICATION 1.1 Communication: Meaning and Definition 1.2 Features of communication 1.3 Oral & written Communication 1.4 verbal and Nonverbal communication	04	06	CO 1
2	Application of Grammar 2.1 Tense & its sub types 2.2 Degree and Its types 2.3 Change the voice	04	06	CO 2
3	Vocabulary Building 3.1 Word Formation Processes Affixation, Echoism, clipping, conversion Back formation, Shortfoms, Acronyms 3.2 Idioms and use of idioms in sentence 3.3 Antonyms and synonyms	04	03	CO 2
4	Language lab and Spoken English 4.1 English sound system (RP) 4.2 Vowels & Diphthongs(RP), Consonants(RP) 4.3 Word Accent, stress a Rhythm and Intonation	04	03	CO 3



5	Nonverbal Communication 5.1 Meaning of Nonverbal Communication 5.2 Use of body language in communication 5.3 Nonverbal codes: Haptics, vocalics, Artifacts, chronemics, proxemics	04	08	CO 1
6	Barriers to communication 6.1 Definition of Barrier 6.2 Types of barriers of communication 6.3 Mechanical, Psychological, Linguistic, Social-cultural & Environmental	05	08	CO 1
7	Paragraph writing 7.1 Types of paragraph writing Inductive and Deductive method 7.2 Development of Paragraph	05	06	CO 4
8	Notice and circular 8.1 Difference between notice and circular 8.2 Drafting notice and circular for Library, gym, office, Students stores facility and sports	06	06	CO 4
9	Letter writing 9.1 Importance of letters writing in business 9.2 7 Cs of letter writing 9.3 Layouts: Block, semi-block, full block 9.4 Job application letter 9.5 Resume writing	08	16	CO 4
10	Reading comprehension 10.1 Unseen passages with wh- type and MCQ types of questions	04	08	CO 3
TOTAL		48	70	



7 (A) LIST OF ASSIGNMENTS: Each student has to write all ten assignments compulsorily as term work.

Sr. No.	Title of Assignments	COs
1.	Explain the process of communication with the help of diagram.	CO 1
2.	Give five examples of each sub type of tense.	CO 2
3.	Find out twenty difficult words from the English newspaper and understand their meaning by using dictionary and use it in your own sentences.	CO 2
4.	Write the phonetic transcription of given words by using dictionary.	CO 3
5.	Explain various types of barriers to communication.	CO 3
6	Explain different nonverbal codes with help of pictures.	CO 1
7	Attempt to answers for given unseen passage for reading comprehension.	CO 3
8.	Explain the Various formats of letter writing with diagram.	CO 4
9	Draft the notice / circular on given topic.	CO 4
10	Develop the paragraph on the given topic	CO 4

Note: # Teacher will do necessary changes in the assignments as per requirements.

7 (B) LIST OF TUTORIALS:

Sr.	Title of Tutorial	Lab /Classroom	Hrs.
1.	Practice of R.P. English sounds to overcome mother tongue impact.	Lang.lab	03
2.	Listen and repeat words with phonemic transcription.	Lang.lab	03
3	Public speaking (Listening Famous speakers)	Lang.lab	02
4	Extempore	Classroom	02
5	Loud reading / Recitation	Classroom	02
6	Debate / Role play	Classroom	02
7	Mock interview	Classroom	02
	Total		16



8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/ Tutorials
2. Minimum TEN no assignments
3. Guest/Expert lectures
5. Slides
7. Group discussions
8. Seminar
9. Self-Learning Online Resources

9 Learning Resources:

Sr. No.	Title Of Book	Author	Publication
1.	Communication Skills for Engineers	C. Murali Krishna	Pearson Education
2.	Technical Communication Principles and Practice	Meenakshi Raman, Sangeeta Sharma	Oxford university press , Chennai
3.	A Communicative Grammar of English	Geoffrey Leech, Jan Swartvik	ELBS – with Longman
4	Body Language	Allan Pease	Sheldon Press, London
5	Basics of Management and Communication Skills	Dr. P.C. Shejwalkar	Everest Publishing House
6	Business Communication Strategies	Matthau M. Monippally	Tata – McGraw – Hill

10. WEBSITE REFERENCES

1. <http://www.free-english-study.com>
2. <https://communicationkills.bandcamp.com>
3. <http://www.english-online.org.uk>
4. <http://www.talkenglish.com>
5. <http://www.learnenglish.de>



11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	CHAPTER	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Communication	3	3	0	06
2	Application of Grammar	-	3	3	06
3	Vocabulary Building	-	-	3	03
4	Language lab and Spoken English	-	-	3	03
5	Nonverbal Communication	4	4	-	08
6	Barriers to communication	4	4	-	08
7	Paragraph writing	--	-	6	06
8	Notice & circulars	--	--	6	06
9	Letter writing	-	8	8	16
10	Reading comprehension	-	-	8	08
TOTAL		11	22	37	70

R - Remembering, U- Understanding, A- Application, AN - Analyzing, E- Evaluation and C- Creating (Bloom's revised taxonomy levels)

Note: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess the students with respect to the attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A, An etc.) in the question paper may vary from above table.

12 COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	NAME OF EXPERT (Internal)	SIGNATURE
1	Prof. Mr. Balaji M. Pande, Lecturer (Senior Scale)	<i>B. Pande</i>
2	Prof. Mrs. Anita A. Kulkarni, Head of Department.	<i>Anita A. Kulkarni</i>
3	Prof. Mrs. Kirti P. Bhawe, Lecturer (Selection Grade)	<i>K. P. Bhawe</i>
	NAME OF EXPERT (External)	
4	Prof. Mrs Aanchal Lalla, Lecturer , K.J.S Polytechnic , Mumbai	<i>Aanchal Lalla</i>



1. COURSE DETAILS

Programme: EE/IE/DE/EXTC	Semester: 1
Course: Engineering Drawing	Group: C*
Course Code: EDG190007	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
02	02	02	--	06	--	--	--	--	--	50	50	--	100

3. COURSE OBJECTIVE

Engineering drawing helps in understanding design of parts, assembly, structure etc. used in engineering field. It supports technology and technical subjects. By achieving visualization and drawing skills, the student will successfully discharge his role on shop floor, design department and inspection department etc.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

Prepare engineering drawing manually using prevailing drawing instruments.

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Draw two-dimensional sectional and non-sectional views of given object using principles of orthographic projections.	Understand, Apply
CO2	Draw isometric views of given component from orthographic projections.	Remember, Understand, Apply
CO3	Draw geometric figures and engineering curves.	Remember, Understand
CO4	Prepare free hand sketches of thread profiles and thread fasteners.	Remember, Understand
CO5	List and apply AutoCAD commands for drafting 2D and 3D drawings.	Remember, Understand, Apply



6. COURSE CONTENTS

Sr.No.	TOPIC/Sub-topic	Hours	Marks	Cos
1	Drawing Instruments and their uses 1.1. Introduction: Importance of Engineering Drawing 1.2. Study the use of Drawing instruments, types of lines and Dimensioning techniques used in Engineering Drawings. 1.3. Study the use of different Scales in Engineering Drawings: Reduce Scale, Enlarge Scale and Full Size Scale 1.4. Geometrical constructions: To draw a perpendicular bisector of a given line. To divide the line into number of equal parts To draw line parallel to one another To Divide the given circle into number of equal parts To draw regular polygon of given side	02	---	CO1
2	Orthographic projections 2.1 Introduction to orthographic and isometric projections, concept and applications. 2.2 Orthographic projection by First angle and Third angle method, and their symbols. 2.3 Conversion of Pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. 2.4 Introduction to Cutting plane line, Hatching Line and Sectioning Conventions. 2.5 Types of sectional views: Half, Full and Off-set sectional Views 2.6 Conversion of pictorial views into sectional orthographic views	06	09	CO1
3	Engineering curves Conic Sections: 3.1 Ellipse: Introduction and Methods to draw an ellipse by oblong, arcs of circle and concentric circle methods. 3.2 Parabola: Introduction and Methods to draw parabola by Directrix-Focus and rectangular methods. 3.3 Hyperbola: Introduction and Methods to draw hyperbola by Directrix-Focus and rectangular methods	04	04	CO3
4	Isometric view and projection 4.1 Introduction to Isometric view and isometric projection. 4.2 Introduction to Isometric scale and Natural Scale. 4.3 Illustrative problems related to objects having plain, slanting, cylindrical Surfaces and slots on slanting surfaces. 4.4 Conversion of orthographic views into isometric View/projection. (Isometric of sphere and composite solids not to be included).	06	08	CO2



5	Free hand sketches Thread Profiles and Screw Fasteners. 5.1 Different thread profiles 5.2 Conventional representations of left hand – right hand threads, single and multistart square threads, external and internal threads. 5.4 Nuts and Bolts: Types of nuts and bolts. Locking of nuts (Castle, slotted nut, simond’s nut etc.), Plane and Spring washers, Types of set screws heads and ends	04	04	CO4
6	Computer Aided Drafting Interface 6.1 Computer Aided Drafting: concept. 6.2 Hardware and various CAD software available. 6.3 System requirement and Understanding the interface. 6.4 Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify toolbar, cursor cross hair Command window, status bar, drawing area, UCS icon. 6.5 File features: New file, Saving the file, opening an existing drawing file, Creating Templates, Quit 6.6 Setting up new drawing: Units. Limits, Grid, Snap 6.7 Undoing and Redoing action	03	08	CO5
7	Computer Aided Drafting 7.1 Draw basic entities like Line, Circle, Arc, Polygon. Ellipse. Rectangle, Multiline, Poly Line. 7.2 Methods of Specifying points: Absolute coordinates. Relative Cartesian and Polar coordinates 7.3 Modify and edit commands like trim, delete, copy. offset. array, block, layers, mirror, rotate, scale, lengthen, stretch, measure, break, divide, explode, align. 7.4 Dimensioning: Linear, Horizontal, Vertical. Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions, 7.5 Dim scale variable. 7.6 Editing dimensions 7.7 Text: Single line Text, Multiline text. 7.8 Layer, Layer Properties and applications. 7.9 Standard sizes of sheet: Selecting Various plotting parameters such as Paper size, paper units, drawing orientation, plot scale, plot offset, plot area, print preview.	07	17	CO5
	TOTAL	32	50	



7. LIST OF PRACTICALS/ASSIGNMENTS/DRAWINGS

Term Work consists of Journal containing following drawing sheets, CAD drawings and a sketchbook.

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approximate Hrs. required	COs
01	One sheet on lettering, lines, dimensioning techniques and geometrical constructions.	02	CO1
02	One sheet with four problems on non-sectional orthographic views for the objects with curvilinear features	08	CO1
	Home Assignments: Four problems in sketchbook		
03	One sheet with four problems on Sectional orthographic projections with full and half section.	10	CO1
	Home Assignments: Four problems in sketchbook		
04	One sheet with four problems on ellipse, parabola and hyperbola.	04	CO3
	Home Assignments: Four problems in sketchbook		
05	One sheet with four problems on Isometric views and projections.	04	CO2
	Home Assignments: Four problems in sketchbook		
06	One sheet on free hand sketches of Thread Profiles and Screw Fasteners	04	CO4
	Home assignments: Free hand sketches in sketchbook		
07	Four problems on non-sectional orthographic views for the objects with curvilinear features by using CAG 2D commands.	16	CO5
08	Four problems on sectional orthographic views for the objects with curvilinear features by using CAG 2D commands	16	CO5

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Slides
3. Self-Learning online resources



9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Engineering drawing	R.K. Dhawan	S.Chand & Co.Ltd., Ram Nagar New Delhi-110 055. ISBN-13: 9788121914314 ISBN-10: 8121914310
2.	Engineering drawing	N.H. Dubey	Nandu Prakashan
3.	Engineering Drawing Practice for Schools and Colleges IS: SP-46	Bureau of Indian Standards.	BIS, Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2
4.	Engineering Drawing	Bhatt, N.D.	Charotar Publishing House, Anand, Gujarat 2010; ISBN: 978-93-80358-17-8
5.	Machine Drawing	Bhatt, N.D.; Panchal, V. M	Charotar Publishing House, Anand, Gujarat 2010; ISBN: 978-93-80358-11-6
6	Engineering Drawing	Shah, P. J.	S. Chand and Company, New Delhi, 2008, ISBN: 81-219-2964-4
7	Essentials of Engineering Drawing and Graphics using AutoCAD	Jevapooan T.	Vikas Publishing House Pvt. Ltd, Noida 2011, ISBN: 978-8125953005
8	AutoCAD User guide	Autodesk	Autodesk Press, USA, 2015
9	AutoCAD 2016 for Engineers and Designers	Sham, Tickoo	Dreamtech Press; Galgotia Publication New Delhi, 2015, ISBN: 978-9351199113

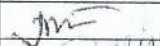
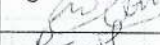

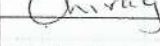
10. WEB REFERENCES

1. <http://pstulpule.com/>
2. <https://www.youtube.com/watch?v=TJ4jGyD-WCw>
3. https://www.youtube.com/watch?v=dmt6_n7Sgcg
4. <https://www.youtube.com/watch?v=MQScnLXL0M>
5. <https://www.youtube.com/watch?v=3WXPanCq9LI>
6. <https://www.youtube.com/watch?v=fvjk7PlxAuo>
7. <http://www.me.umn.edu/courses/me2011/handouts/engg%20graphics.pdf>
8. <https://www.machinedesignonline.com>
9. <http://www.mycadsite.com/tutorials/>
10. <http://tutorial145.com/learn-autocad-basics-in-21-days/>
11. <https://www.lynda.com/AutoCAD-training-tutorials/160-0.html>
12. <http://www.investintech.com/resources/blog/archives/5947-free-online-autocadtutorials-courses.html>
13. <http://www.cad-training-course.com/>
14. <http://au.autodesk.com/au-online/overview>



15. <https://www.youtube.com/watch?v=yruPUj61bw>
16. <https://www.youtube.com/watch?v=xqu18gcdwbs>
17. <https://www.youtube.com/watch?v=JTOP6TV4Mvw>
18. <https://www.youtube.com/watch?v=x7X25Xpa07o>
19. <https://www.youtube.com/watch?v=Si93Y36tU1nY>

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri N.M.Pathak	
2	Internal	Shri N.M.Patil	
3	Internal	Shri P.R.Parate	
4	External	Shri Chirag Kachaliya	
		Organisation: M/s Mihir industries Pvt.Ltd.	



1. COURSE DETAILS

Programme: IE/DE/EXTC/EE	Semester: I/II/III
Course: C Programming	Group: C*
Course Code: CPR 190019	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
2	4	-	-	6	-	-	-	-	-	50	50	-	100

3. COURSE OBJECTIVE

Automation Industry needs to build Microcontroller based application which are being developed using 'C'. This course deals with concepts of programming to enhance programming skill of diploma students. This course will enable the students to inculcate programming concepts and methodology to solve engineering problems.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experience:

Develop 'C' programs to solve broad based electronic engineering related problems.

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	Compare various types of programming languages and describe C fundamentals.	U
2	Draw Flowchart & Develop algorithm in Programming language.	U, A
3	Use of control flow statements in C.	R
4	Study of C Pre-processor & String handling	R
5	Build C Programs with the help of Function, Array, Pointer, Structure and Union	U, A



6. COURSE CONTENTS

Sr.	TOPIC/ Sub Topic	Hours	COs
1	Introduction to Programming Introduction 1.1 Why Programming? 1.2 What is Programming? 1.3 Why so many Programming language? 1.4 Introduction Flow chart & Algorithm	2	CO 1 CO 2
2	Getting started with C 2.1 What is C? 2.2 Constant, Variable & Keywords 2.3 Compilation and Execution 2.4 Console IO Operations: printf , scanf 2.5 C Instruction 2.5.1 Type Declaration Instruction 2.5.2 Arithmetic Instruction 2.5.3 Control Instruction	4	CO 1
3	Control Flow Statement 3.1 If statement 3.2 If-else Statement 3.3 Switch Statement 3.4 Unconditional Branching using goto statement 3.5 While Loop 3.6 Do While Loop 3.7 For Loop 3.8 Break and Continue	8	CO 3
4	Function 4.1 Introduction 4.2 Function declaration and Prototype 4.3 Scope of variable and storage classes 4.4 Pass by value & reference 4.5 Recursion	4	CO 5
5	Array 5.1 Introduction 5.2 Arrays Declaration and Initialization 5.3 One dimensional arrays 5.4 Two dimensional arrays. 5.5 Introduction to character arrays 5.6 Arrays as Function Parameters	3	CO 5
6	Pointers 6.1 Introduction 6.2 Pointer Declarations, passing pointer to function 6.3 Dynamic memory allocation 6.4 Operations on pointers	3	CO 5



7	String Handling 7.1 Introduction to Strings 7.2 Sample Program 7.3 Standard String Library Functions 7.4 Array of String	3	CO 4
8	Structures and Unions 8.1 Declaring and Instantiating Structures 8.2 Structure as Parameter and Pointer to Structure 8.3 Array of Structure 8.4 Union	3	CO 5
9	The C Preprocessor 9.1 Features 9.2 Macro Expansion 9.3 File Inclusion 9.4 Conditional Compilation 9.5 <i>#if</i> and <i>#elseif</i> Directives	2	CO 4
	TOTAL	32	

7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum no of 24 programs/mini project with approx.no of hours required and corresponding COs:

Sr. No.	Title of Programs	Approx.Hrs required	COs
1	Introduction to C	2	1,2
2	To implement printf and scanf functions for user input -output	2	1
3	To implement the working of identifier, constant and variables.	4	1
4	To implement the working of arithmetic operators.	2	1
5	To implement the working of relational & logical operators.	2	1
6	To implement Implicit & Explicit type casting	4	1
7	To implement the concept of if, if... else, conditional statements(two problems each)	4	2,3
8	To implement the concept of nested if, & else if... ladder conditional statements(two problems each)	4	2,3
9	To implement the concept of switch...case statement(two problems each)	4	2,3
10	To implement the concept of goto, break & continue statement	4	2,3
11	To implement the concept of Loops i.e. while, for & do-while(two problems each)	4	2,3
12	To implement the concept of one dimensional arrays(two problems each)	4	2,5
13	To implement the concept of two dimensional arrays(two problems each)	4	2,5
14	To implement the concept of string & it's various operations	2	4
15	To implement the concept of user defined functions.	2	2,5
16	To implement the concept of user defined functions with recursion	2	2,5



17	To implement the concept of structures i.e. Arrays within structure & Arrays of structures	4	2,5
18	To implement the concept of pointers	4	2,5
19	To implement the concept of nesting of functions	2	2,5
20	Mini project using all C concepts.	4	2,3,5
	TOTAL	64	

8. IMPLEMENTATION STRATEGY(PLANNING)

1. Teaching Plan/Tutorials
2. Minimum no of practical/assignments/drawings etc.
3. Guest/Expert lectures
4. Demonstrations/Simulations

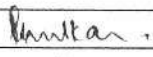



9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	C Programming	Balaguru Swami	Tata McGrew Hill
2.	Let Us C	Yashavant Kanetkar	BPB Publication
3.	Programming with C	Byron Gottfried	Tata McGrew Hill, SCHAUM's series
4	Head First C	David Griffiths	O Really

10. WEB REFERENCES

1. <http://www.tutorialspoint.com/cprogramming/>
2. <http://www.cs.cf.ac.uk/Dave/C/CE.html>
3. <http://www.technoexam.com/>
4. <http://www.thestudymaterial.com/c-c-programs.html>

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mrs. A.A.Kulkarni	
2	Internal	Mr. S.S.Rokade	
3	Internal	Mr. J.S. Kulkarni	
4	External	Umang Patel Organisation K.J. Somaya College of Engg.	



1. COURSE DETAILS

Programme: IE/DE/EXTC	Semester: I
Course: Electronic Materials, Components and Devices	Group: C*
Course Code: EMC194701	Duration :16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	2	-	-	5	3	70	20	10	70	25	-	50	175

3. COURSE OBJECTIVE

A technician is expected to have some basic knowledge of materials used for fabrication of electronic devices used in the field of Electronics Engineering. This course is designed to introduce with basics of various materials, components and devices, their working principle and characteristics.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain following industry identified skill through various teaching learning experiences

- Test and use electronic components.

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	Define, list, state, identify and classify electronics materials, components and devices.	Remember
2	Identify and compare types of components and understand construction, working principle, specifications and applications.	Remember
3	Illustrate the knowledge of electronic materials and components and basic of IC fabrication.	Understand
4	Test components and prepare component testing procedure.	Apply



6. COURSE CONTENTS:

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	Conductor /Semiconductor : 1.1 Conductivity 1.2 Mobility and Conductivity 1.3 Types of conductors 1.4 Effect of temperature on conductivity 1.5 Resistor Temperature Coefficient 1.6 Classification like low resistance and high resistance materials 1.7 Super conductivity materials, application. 1.8 Thermoelectric Effect 1.9 Semi-Conductor Materials 1.10 Study of electronic devices(Only Symbol, identification and testing using multimeter)-Diode, BJT ,FET, UJT, Diac, Triac, SCR	06	07	CO1 CO2 CO4
2	Insulators 2.1 Dielectric constant 2.2 Dielectric strength, Dielectric loss, Dielectric polarization, 2.3 Various kinds of dielectric material and their application in electronics 2.4 Active Dielectrics	04	06	CO1 CO3
3	Magnetic Materials 3.1 Theory of Magnetism 3.2 Classification of Magnetic Material 3.3 Concept of Anti Ferromagnetism 3.4 Ferro-magnetic materials, B.H. Curve, hysteresis loop 3.5 Effect of air gap on hysteresis.	02	04	CO1 CO3
4	Components 4.1 Reliability and specification of Electronic passive and active components 4.2 Conventional Symbols 4.3 Stability, drift, reliability, failure 4.4 Environmental hazards	02	04	CO2 CO3



5	Resistors 5.1 Brief manufacturing process 5.2 Classification of resistors 5.3 Characteristics of resistors 5.4 Applications of resistors. 5.5 Specification of resistors 5.6 Test and measurement of resistors	07	11	CO1 CO2 CO3 CO4
6	Cells and batteries : 6.1 Concept of ideal voltage and current sources. 6.2 Types of batteries 6.3 Specifications of Batteries	03	04	CO1 CO2
7	Capacitors 7.1 Brief manufacturing process 7.2 Different types 7.3 Frequency response of capacitor 7.4 Characteristics of Capacitor 7.5 Specification of Capacitors 7.6 Capacitor testing 7.7 Applications.	06	08	CO1 CO2 CO4
8	Inductors : 8.1 Types of inductors, Quality factor, self and mutual inductance, frequency response of inductor 8.2 R.F. coils, saturable inductors 8.3 Specification of inductors 8.4 Application of inductor Core 8.5 Transformer, Leakage inductance, core and copper loss 8.6 Material used for transformer 8.7 Specifications of Transformer 8.8 Types of transformers and applications.	06	08	CO1 CO2 CO4

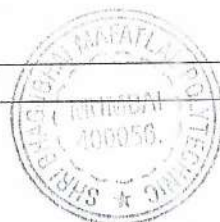


9	Relays ,switches and display 9.1 Relay characteristics, contact rating, hold, Non pick up, Drop out, Transfer time 9.2 Classification of relays and their specifications. 9.3 Common Electrical and mechanical test for relays 9.4 Different types of switches like thumb wheel, Lever wheel, Rotary selector type s, Matrix type switches, Sensing switches, Reed relays 9.5 Different types of display devices 9.5.1 LED-Types, Specifications, Applications 9.5.2 LCD-Principle of working, Type, Specification, Application	07	10	CO1 CO2 CO3 CO4
10	IC Fabrications 10.1 Introduction 10.2 Advantages of IC 10.3 Monolithic IC 10.4 Hybrid IC's (thin and thick films) 10.5 Moore's law, Scaling w.r.t. VLSI 10.6 Steps involved in IC fabrication	05	08	CO3
TOTAL		48	70	

7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of journal containing minimum number of 10 experiments/Assignments .

Sr. No.	Title of Experiment/Assignment	Approx.Hrs required	COs
1	Study of Resistors.	2	CO2 CO4
2	Study of Capacitors.	2	CO2 CO4
3	Study of Inductor.	2	CO2 CO4
4	Testing of devices (Diode, BJT ,FET, UJT, Diac, SCR)	2	CO2 CO4
5	Study of relays and switches.	2	CO2 CO4
6	Study of LED display.	2	CO4
7	Testing of components using curve tracer.	2	CO4
8	To study frequency response of capacitor.	2	CO3 CO4
9	To study frequency response of inductor.	2	CO3 CO4
10	Assignment on Cells and batteries.	2	CO4



11	Study and testing of Transformer.	2	CO2
12	Introduction to simulation software	2	CO4
13	To simulate diode characteristics	2	CO4
14	To simulate Rectifier circuit	2	CO4
15	Assignment on IC fabrication	2	CO3

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Minimum no of practical/assignments/drawings.
3. Demonstrations/Simulations
4. Slides
5. Self Learning Online Resources

9. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1.	Madhuri Joshi.	Electronic Components and Materials	Wheeler Publishing Allahabad
2.	S M Dhir	Electronic Components and Materials	Tata McGraw Hill

10. WEB REFERENCES

1. www.electronicsandyou.com
2. www.electrical-symbols.com
3. www.nptel.ac.in

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Conductor / Semiconductor	3	4		07
2	Insulators	4	2		06
3	Magnetic Materials		4		04
4	Components	4			04
5	Resistors	1	4	6	11
6	Cells and batteries			4	04
7	Capacitors	2	2	4	08
8	Inductors	2	2	4	08
9	Relays, Switches and Displays	2	4	4	10
10	IC Fabrication	4	4		08
	Total	22	26	22	70

R Remember, U Understand, A Apply and above, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.



12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr N.G.Farkade	<i>N.G.Farkade</i>
2	Internal	Mr P.S. Dhuri	<i>P.S.Dhuri</i>
3	Internal	Mr B.N.Surve	<i>B.N.Surve</i>
4	External	Ms. Bahar Soparkar Organisation: D.J. Sanghvi College of Engg	<i>Bskar</i>



1. COURSE DETAILS

Programme: CE/ME/EE/IE/PL/CH/DE/EXTC	Semester: II
Course: Engineering Mathematics	Group: B*
Course Code: EMT190009	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per					Examination Scheme and Maximum Marks								Gr	Scheme L/P/Cr	
Weekly Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(FSE)		SSL	TA	TH	TW	PR	OR			TOTAL
					Hours	Marks									
3	-	-	2	5	3	70	20	10	70	25	-	-	125	B*	325

3. COURSE OBJECTIVE:

This Course is being introduced to provide mathematical background needed for any Diploma engineer. It intends to enable the students to apply basic facts, concepts and principles of differential calculus, vector algebra, complex number, Indefinite integral, Numerical method and Statistics as a tool to analyze engineering problems.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified

Competency through various teaching learning experiences:

- Solve broad-based Engineering problems using the Advanced Knowledge of mathematics

5. COURSE OUTCOMES (COs) At the end of the semester student will be able to :-

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	Use the concepts of differential calculus to solve engineering related problems.	R, U
2	Apply basic concepts of vector algebra and complex number in the field of elementary engineering problems.	R, U, A
3	Study the concept of Indefinite Integral.	R, U
4	Understand the concept of Probability distribution and Statistics apply to evaluate the problems.	U, A



6. COURSE CONTENTS

Sr No.	TOPIC Sub-Topics	Hours	Marks	Cos
1	Derivatives 1.1 Definition of Derivatives 1.2 Rules of Differentiation 1.3 Composite function 1.4 Inverse trigonometric function 1.5 Implicit function 1.6 Logarithmic function 1.7 Parametric function 1.8 Partial derivatives of first order(two variable)	12	17	CO1
2	Vector Algebra 2.1 Definition of vector 2.2 Algebra of vectors, equality, addition, subtraction and multiplication, 2.3 Dot product and Cross product 2.4 Scalar triple product 2.5 Work done 2.6 Moment of force about a point and line	06	09	CO2
3	Probability Distribution 3.1 Definition of probability, addition and multiplication theory of probability 3.2 Probability Distribution <ul style="list-style-type: none"> • Normal Distribution • Binomial Distribution 	06	09	CO4
4	Integration 4.1 Definition of integration as anti-derivative 4.2 Integration of standard functions 4.3 Composite Integrals 4.4 Integration of sum and difference of two or more functions 4.5 Integrals of Simple Algebraic Rational Function 4.6 Integrals of Simple Trigonometric Function 4.7 Method of integration By Partial fraction	12	15	CO3
5	Complex Number 5.1 Definition of complex number 5.2 Algebra of complex number - equality, addition, subtraction, multiplication and division 5.3 De Moivre's theorem 5.4 Euler's form of circular function	06	09	CO 2



Statistics 6.1 Range, coefficient of range of discrete and grouped data 6.2 Mean deviation and standard deviation from mean of grouped and ungrouped data, weighted means 6.3 Variance and coefficient of variance 6.4 Comparison of two sets of observation	06	11	CO 4
	48	70	

7. LIST OF ASSIGNMENTS/TUTORIALS

Term Work consists of Journal containing minimum no of 12 tutorials.

Sr. No.	Title of Tutorial	Approx.Hrs required	COs
1	Assignment on Differentiation. (Rules of Differentiation, Composite function, Inverse trigonometric function, Implicit function)	4	1
2	Assignment on Differentiation. (Logarithmic function Parametric function, Partial derivatives of first order, Second order differentiation)	4	1
3	Assignment on Vectors. (Dot product and Cross product Scalar triple product)	2	2
4	Assignment on Vectors. (Work done, Moment of force about a point and line)	2	2
5	Assignment on Probability. (Probability Distribution, Normal Distribution, Binomial Distribution, Poisson's distribution)	2	4
6	Assignment on Integration. (Integration of standard functions Composite Integrals, Integration of sum and difference of two or more functions)	4	3
7	Assignment on Integration. (Integrals of Simple Algebraic Rational Function, Integrals of Simple Trigonometric Function Method of integration)	4	3
8	Assignment on Statistics	4	4
9	Assignment on Complex Number	4	2
10	Practicing Integration and Statistics on MATLAB.	2	3
	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Assignments
3. Home Work Assignment



9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Calculus for Polytechnics	Shri. S.P.Deshpande	Pune Vidyarthi Graha Prakashan Pune-30
2.	Applied Mathematics	Shri. B.M. Patel, Shri J.M. Rawal	Nirali Prakashan Mumbai
3.	Higher Engineering Mathematics	Dr. B.S. Grewal	Khanna Publishers 2/B, Delhi-6
4	Applied Mathematics	G.V.Kumbhojkar	P.Jamnadas LLP

10. WEB REFERENCES

1. www.mic-mathematics.com
2. www.math.com
3. www.lenerstv.com
4. www.onlinetutorials.com
5. www.archives.math.utk.edu

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

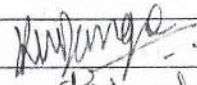
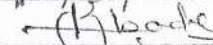
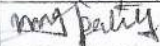
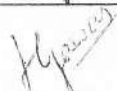
Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Derivatives	7	10		17
2	Vector Algebra	2	5	2	09
3	Probability	1	5	3	09
4	Integration	5	10		15
5	Complex Number	2	5	2	09
6	Statistics	2	4	5	11
TOTAL		19	39	12	70

R Remembering, U Understanding, A Applying and Above (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.



12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	MS.Kavita.K.Dange	
2	Internal	Mr.R.R.Ambade	
3	Internal	Mr.U.J.Patel	
4	External	Ms.Meena Gawas Organisation: Mithibai College Of Arts and Science	



1. COURSE DETAILS

Programme: CE/ME/EE/IE/PE/CHE/DE/EXTC

Course: Applied Chemistry

Course Code:ACH190002

Semester: I/II

Group: B*

Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	--	--	6	1	@70	20	10	70	25	50	--	175

3. COURSE OBJECTIVE

The course of applied chemistry is designed considering two aspects

- Basic principles of Chemistry
- Chemistry of materials

The basic principles of Chemistry as in Atomic Structure, Electrochemistry, concepts of Corrosion and Lubrication are essential to understand the various processes and their feasibility while the knowledge of chemical behavior of different chemicals and materials (metallic and non-metallic) help in appropriate selection of material for various engineering applications. The selection of materials not only depend on physical and chemical behavior but is also based on environmental and ecofriendly factors.

4. SKILL COMPETENCY

Following Skills and competency will be developed

- Identify the concepts involved in various industrial processes.
- Handle, operate equipment and reagents.
- Measure the values and interpret the observation.
- Accuracy in recording and record keeping.
- Safety and care of basic instruments, glassware.



5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Predict the chemical and physical properties of different elements and write the correct names and formulae of different compounds.	Remember
CO2	Select appropriate cells/batteries for different purposes.	Understand, Apply
CO3	Select appropriate material- metallic, non-metallic, lubricants for different engineering applications.	Understand, Apply
CO4	Identify the type of corrosion and apply suitable preventive measures.	Understand, Apply
CO5	Analyse water sample and predict its suitability for various processes.	Understand, Apply

6. COURSE CONTENTS

Sr. No.	TOPIC/ Sub-Topics	Hours	Marks	COs
1	1. Atomic Structure 1.1 Structure of atom Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars 1.2 Bohr's Theory and Quantum Numbers Concept of Orbits & Orbitals. 1.3 Rules for distribution of electrons in an atom Hund's Rule, Aufbau's Principle, Pauli's exclusion principle Electronic configuration of first twenty elements 1.4 Nuclear stability and Numerical problems based on it 1.5 Chemical Bonding Valency, Octet Rule, Duplet Rule Formation of Electrovalent & Covalent Compounds e.g. NaCl, CaCl ₂ , MgO, AlCl ₃ , CO ₂ , H ₂ O, Cl ₂ , NH ₃ , C ₂ H ₄ , N ₂ , C ₂ H ₂	12	15	CO1
2	2. Electrochemistry 2.1 Concept of Ionisation & Electrolytic Dissociation Arrhenius' theory, Degree of ionization 2.2 Electrolysis. Terms Involved in Electrolysis. Mechanism of electrolysis. Faraday's Laws of Electrolysis and Numerical problems based on it. 2.3 Applications of electrolysis Electroplating & Electro refining, Electrometallurgy & Electrotyping 2.4 Cells and Batteries – Classification Primary cell (Daniel cell), Secondary cell (Lead Acid Storage cell) Lithium batteries Solar cells – advantages, disadvantages.	10	10	CO2



3	3. Metals & Alloys Metals 3.1 Characteristics of Metals 3.2 General Metallurgical processes 3.3 Physical properties and applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Ag and Si. 3.4 Alloys Preparation, purposes of making alloy, classification (Ferrous & Non Ferrous) Composition, properties and application of Duralumin, Magnalium, Monel Metal, Gun metal, Brass, Bronze, Babbit metal and Ferrous alloys Alnico, Stainless Steel.	09	10	CO3
4	4. Water and pH: 4.1 Physical and chemical characteristics of water. 4.2 Hardness of water a) Causes and Types of Hardness b) Disadvantages of hard water – (Domestic and Industrial) Hard water in boilers and prevention: Boiler corrosion, caustic embrittlement, priming and foaming, scales and sludge. 4.3 Degree of Hardness and numerical problems based on it. 4.4 Water softening: zeolite process, ion exchange process (cation exchange and anion exchange). 4.5 Acids and bases 4.6 pH Concept of pH Applications of pH and numerical problems based on it.	09	09	CO5
5	5. Corrosion and Protective Coatings: Corrosion: 5.1 Types of Corrosion 5.2 Mechanism of Corrosion 5.3 Factors affecting corrosion 5.4 Methods of prevention of corrosion. 5.5 Methods of applying Metal coatings.	11	11	CO4
6	6. Lubricants: 6.1 Definition 6.2 Functions of Lubricants 6.3 Theories of lubrication 6.4 Classification and characteristics of Lubricants 6.5 Selection of Lubricants for different machines	07	06	CO3
7	7. Non-Metallic Engineering Materials 7.1 Polymerization, Types. 7.2 Plastics – Definition, types, compounding of plastic, properties and application 7.3 Rubber – Natural rubber & synthetic rubber properties of rubber, applications of rubber. Vulcanization of Rubber. 7.4 Thermal Insulators – Definition, characteristics, preparation, properties and applications of thermocole and glasswool.	06	09	CO3
	TOTAL	64	70	

7. LIST OF PRACTICALS

Term Work consists of Journal containing minimum no. of 10 experiments

Sr. No.	Title of Experiment	Approx.Hrs required	COs
01 to 03	Techniques of determination of concentration of solutions: <u>Volumetric Analysis</u> a) Neutralization Titration i) Titration between Strong Acid and Strong Base using Phenolphthalein as indicator – 2 sets b) Redox Titration i) Titration between KMnO_4 and $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	10	CO4 CO5
04 to 05	Determination of: a) Hardness of water using EDTA b) Chloride content in water	04	CO5
06	Determination of pH of different solutions.	02	CO5
07 to 08	<u>Qualitative Analysis of Two Solutions</u> containing One Basic and One Acidic Radical listed below: a) Basic Radicals: Pb^{+2} , Cu^{+2} , Al^{+3} , Fe^{+2} , Fe^{+3} , Ca^{+2} , Ba^{+2} , Mg^{+2} , K^+ , Na^+ . b) Acidic Radicals: Cl^- , SO_4^{-2} , CO_3^{-2} , NO_3^- .	10	CO1 CO2 CO3
09	Determination of Viscosity of a Lubricant.	02	CO3
10	Determination of Flash Point of a Lubricant using: a) Abel's Flash Point Apparatus b) Pensky Marten's Flash Point Apparatus	04	CO3
	TOTAL	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan.
2. Minimum no of practical/assignments.
3. Self Learning Online Resources
4. Worksheets for practice



9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Chemistry of Engineering Materials	Jain and Jain	Dhanpat Rai Publishing Co. New Delhi
2.	Engineering Chemistry	Narkhede & Thatte	
3.	Chemistry for Engineering students	Mahadeokar & Dr. U. P. Kodgire	Everest Publishing House, Pune
4.	Applied Chemistry	B.S. Godbole	Satya Prakashan, New Delhi
5.	Polytechnic Chemistry	Rao A.A.	New Age International 2007
6.	Applied Chemistry	Shete S.D.	S. Chand & Company
7.	A Text Book of Engineering Chemistry	Dara S.S.	S. Chand & Company, New Delhi-2008

10. WEB REFERENCES

- www.chemistryexplained.com
- <https://schools.aglasem.com>
- <https://www.thebalance.com>
- <https://water.usgs.gov/edu/hardness.html>
- <https://engineeringinsider.org>
- <http://web.mit.edu/5.33/www/lec/poly.pdf>

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN SEM-END ONLINE EXAMINATION

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Atomic Structure	8	4	3	15
2	Electrochemistry	2	4	4	10
3	Metals and Alloys	4	2	4	10
4	Water and pH	2	4	3	09
5	Corrosion and protective coatings	2	7	2	11
6	Lubricants	2	2	2	06
7	Non-metallic engineering materials	4	2	3	09
TOTAL		24	25	21	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	S.V.Suvarna	<i>S.V.Suvarna</i>
2	Internal	K.P.Bhave	<i>K.P.Bhave</i>
3	Internal	R.D.Shimpi	<i>R.D.Shimpi</i>
4	External	Dr. S. Ujni Organization: Mucchala Polytechnic Thane.	<i>S.Ujni</i>



1. COURSE DETAILS: Development of Life skills

Program: CE / ME /EE/ IE/PE/CH/DE/EXTC	Semester: I/II
Course: Development of Life skills	Group: B*
Course Code : DLS 190004	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								
Theory	Practical	Drawing	Tutorials	Credits (L+P+D+T)	Theory Paper Duration and marks		SSL	TA	Theory	TWK	PR	OR	Total
					Hours	Marks							
02	-	-	01	03	-	-	-	-	---	50	--	50	100

3. COURSE OBJECTIVE: Life skills include psycho-social competencies and interpersonal skills that help people make informed decisions, solve problems, think critically and creatively, communicate effectively, build healthy relationships, empathize with others, by managing one's life in a healthy and productive manner. Life skills are essentially those abilities that help to promote overall wellbeing and competence in young people as they face the problems of real life. Children learn Life Skills from parents, teachers and significant others individuals to translate knowledge, attitude and values into actual abilities.

4. SKILL / COMPETENCY: This course helps the students to develop following skills/ competencies.

1. Decision making
2. Problem solving
3. Time management
4. Presentation and Grooming skills
5. Interpersonal and communication skills



5. COURSE OUTCOMES (Cos) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOMES	Bloom Level
1	Find out one's Strengths, Weaknesses, opportunities and threats to contribute as youth force.	Remember
2	Make use of maximum time for more creative and constructive work.	Application
3	Demonstrate the leadership quality by making decisions while working as team member.	Understand
4	Solve the intra- personal and inter-personal conflict with highly motivated efforts.	Apply

6. COURSE CONTENTS:

Sr. No.	TOPIC/Sub-topic	Hours	COs
1	PERSONALITY DEVELOPMENT 1.1 Introduction, 1.2 Determinants of Personality- biological, Psychological and socio- cultural factors. 1.3 Areas of Personality development, 1.4 self-analysis,	03	CO 1
2	TIME MANAGEMENT 2.1 Introduction, properties of time 2.2 Time planning, how to plan time, 2.3 Time wasters, Time management 2.4 Time matrix	03	CO 2



3	STRESS MANAGMENT 3.1 Definition of stress, 3.2 Types of personality and stress, 3.3 Sources of stress 3.4 Stress Busters 3.5 Psychological reaction to stress 3.6 Yoga and stress control	03	CO 1
4	PROBLEM SOLVING AND DECISION MAKING 4.1 Definition, 4.2 Steps in Problem Solving 4.3 Factors Influencing Problem Solving 4.4 Definition Process, Need Consequences, 4.5 Models of Decision Making 4.6 Goal Setting	03	CO 3
5	POWERPOINT PRESENTATION 5.1 How to prepare Power point presentation 5.2 Use of aids –OHP, LCD projector, board 5.3 Use of body language and Grooming	04	CO 2
6	MOTIVATION 6.1 Introduction to Motivation 6.2 Need for Motivation 6.4 Self- Motivation, 6.5 Theories of Motivation	03	CO 4
7	CONFLICT MANAGEMENT 7.1 Definition of Conflict 7.2 Sources of Conflict, 7.3 Types of Conflict, 7.4 Conflict Resolution, 7.5 Steps In Conflict Resolution	03	CO 4



8	SWOT ANALYSIS 8.1 Concept of SWOT 8.2 Scope of SWOT, 8.3 SWOT as decision making tool, 8.4 How to go about SWOT	04	CO 1
9	LEADERSHIP 9.1 Meaning and Definition of leadership 9.2 Importance of leadership 9.3 Types of leaderships: Autocratic, Democratic, bureaucratic, Delegative, liaise Fair	03	CO 3
10	INTERVIEW AND GROUP DISCUSSION 10.1 Meaning of Interview and G.D. 10.2 Importance of Interview and G.D. 10.3 Process of Group discussion 10.4 Types of Interview and Do's and Don'ts for Interview	03	CO 1
		32	

7(A) SUGGESTED ASSIGNMENTS: Each student has to write all ten assignment compulsorily as part of term work

Sr. No	Title of Assignments	COs
01.	Identify your areas of self-development and plan strategies to improve it.	CO 1
02.	Prepare your daily time table for any average day, enlist your time- wasters. How can you improve your time utility?	CO 2
03.	Define stress; enlist yours Stress-factors and Stress- busters.	CO 1
04.	Give a power point presentation in team on topic assigned by teacher.	CO 2
05.	Enlist the things that Motivate and Demotivate you.	CO 4
06	Enlist at least ten reasons of interpersonal conflict and solutions on it.	CO 4



07	Do your self-analysis and write down your S.W.O.T. as an individual.	CO1
08.	Describe a situation when you had to make an immediate decision on a critical issue.	CO 3
09	Write an illustration on leader that motivate you.	CO 3
10	Enlist and explain the types of interview with Do's and Don'ts for Interview.	CO 1

Note: # Teacher will do necessary changes in the assignments as per requirements.

7 (B) LIST OF TUTORIALS:

Sr.	Title of Tutorial work	Lab/ Classroom	Hrs.
1.	Role Play / Simulation	Classroom	03
2.	Video Screening	Classroom	02
3	Syndicate Task	Classroom	02
4	Extempore	Classroom	02
5	Case Studies	Classroom	02
6	Debate	Classroom	02
7	Mock interview	Classroom	03
	Total		16

8. IMPLEMENTATION STRATEGY (PLANNING)

01. Teaching Plan/Tutorials
02. Minimum TEN no. of assignments
03. Guest/Expert lectures
04. Brainstorming
05. Group discussions
06. Seminar
08. Self-Learning Online Resources
09. Role plays




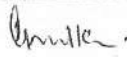
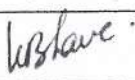
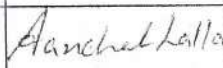
9. SUGGESTED LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Development of Generic skill-I Development of life skills -II	K. Sudesh	Nandu Publication ,Mumbai
2.	Personality Development,	Hurlock, B. Elizabeth	Tata Mc Graw Hill Publishing Company Limited, New Delhi. 2007
3.	Life Skills Training for Positive Behaviour	Nair. A. Radhakrishnan,	Rajiv Gandhi National Institute of Youth Development, Tamil Nadu.
4	Managing Time First	Dr.R.L.Bhatia	Wheeler Publishing 1994

10. WEB REFERENCES

1. http://www.cbse.nic.in/cce/life_skills
2. <https://www.britishcouncil.gr/en/life-skill>
3. <https://www.learningliftoff.com>
4. <https://www.skillsyouneed.com>
5. <https://bigthink.com>

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	NAME OF EXPERTS (Internal)	SIGNATURE
1	Prof. Mr. Balaji M. Pande, Lecturer (Senior Scale)	
2	Prof. Mrs. Anita A. Kulkarni, Head of Department.	
3	Prof. Mrs. Kirti P. Bhave, Lecturer (Selection Grade)	
	NAME OF EXPERTS (External)	
1	Prof. Aanchal Lalla, Lecturer, K.J.S. Polytechnic, Mumbai.	



1. COURSE DETAILS:

Programme: IE/DE/EXTC	Semester: II
Course: Workshop Practice (EX)	Group: B*
Course Code: WSP191001	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

. Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
-	4	-	-	4	-	-	-	-	-	50	-	-	50

3. COURSE OBJECTIVE

Electronics engineering diploma holders are expected to handle various mechanical and Electronics tool. He has to supervise soldering work, fitting, PCB making and wiring in the field in engineering. This course will develop skills in handling tools, equipment used in electronics industry.

4. SKILL COMPETENCY

The aim of the course is to develop following industry identified competency through various teaching learning process.

- Build ,test simple electronic circuits and PCBs

5. COURSE OUTCOMES (COs) (Mechanical) : At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	Identify various marking, measuring, holding, striking and cutting tools & equipment.	A
2	Classify and use various workshop equipments and tools for different workshop jobs.	U
3	Recall safety practices while working in industry.	R

COURSE OUTCOMES (COs) (Electronics): At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
4	Do the reliable soldering, de-soldering of components, connectors and cable forming.	A,R
5	Design, wind and test coils and transformer.	A
6	Draw an artwork for PCB. Fabricate and test single sided PCB.	A,U



6. COURSE CONTENTS

Mechanical Workshop

Sr.No.	TOPIC/SUB-TOPIC	Hours	Marks	COs
1	CARPENTRY 1.1 Demonstration of safety equipments & their working, Safety precautions, First aid, safety rules in workshop, layout of workshop, Issue and return system of lockers. 1.2 Introduction, Various types of Woods, joints 1.3 Different types of Tools, Machines and Accessories 1.4 Demonstration of different Wood Working Tools/ Machines 1.5 One Carpentry job as per drawing per student covering different Wood Working Processes like Planning, Marking, Chiselling, Grooving, etc.	08	10	CO1 CO2 CO3
2	FITTING 2.1 Introduction, Various Marking, Measuring, Cutting, Holding and Striking tools 2.2 Different Fitting operation like Chipping, Filing, Right angle, Drilling, Tapping 2.3 Introduction to Vernier caliper, it's working and use 2.4 Demonstration of different Fitting Tools and Drilling Machines and Power Tools 2.5 Demonstration of different operations like Chipping, Filing, Drilling, Tapping, Cutting etc. 2.6 One Fitting assembly job as per drawing per student involving practice of Chipping, Filing, Drilling, Tapping, Cutting and sawing operations.	12	15	CO1 CO2 CO3
3	WELDING 3.1 Introduction of welding 3.2 Types of welding joints, arc welding 3.3. Demonstration of different welding tools / machines 3.4. Demonstration of One job (Butt Joint or Lap Joint) of Arc Welding processes for group of student as per drawing.	08	-	CO2 CO3
4	DEMONSTRATION OF ONE JOB ON LATHE MACHINE 4.1 Demonstration of Lathe machine. 4.2 Demonstration of various parts of Lathe machine. 4.3 Demonstration of various operations performed on Lathe.	02	-	CO2
5	INTRODUCTION TO CNC MACHINE 5.1 Introduction to various parts of CNC machine.	02	-	CO2
		32	25	



Electronics Workshop

Sr. No.	TOPIC/SUB-TOPICS	Hours	Marks	COs
4	4.0 Solder and soldering techniques: 4.1 Principles of solder connections 4.2 Solder alloys 4.3 Solder fluxes 4.4 Forming techniques 4.5 Soldering /de soldering Techniques 4.6 Solder mask 4.7 Reflow soldering techniques 4.8 Testing and quality control	12	05	CO4
5	5.0 Inter connection techniques: 5.1 BNC connection 5.2 D-type connection 5.3 FRC connector 5.4 Cable forming 5.5 Wire wrapping tool and wire wrapping 5.6 Crimping	04	-	CO4
6	6.0 Transformer Winding: 6.1 Different types of cores and their characteristics 6.2 Testing of coils and transformers 6.3 Manual and automatic winding machines 6.4 Making and Primary Testing of transformer	04	05	CO5
7	7.0 Study of software package for a PCB design Design of single sided PCB for given circuit diagram	06	05	CO6
8	8.0 PCB fabrication: 8.1 Film master production 8.2 Properties of copper clad laminates 8.3 Board cleaning before pattern transfer 8.4 Photo printing 8.5 Screen printing 8.6 Plating 8.7 Etching 8.8 Testing 8.9 Introduction to multilayer PCB	04	10	CO6
9	9.0 Surface Mount Devices and Technology: 9.1 Introduction to surface mount technology 9.2 Advantages of SMT 9.3 Types of SMT assemblies 9.4 SMD types 9.5 Costing of SMT equipment and assembly 9.6 Inspection methods and rework stations in SMT	02	-	CO4
TOTAL		32	25	



7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/JOBS/DEMONSTRATION:

(Mechanical)

- 1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.
- 2] The workshop diary/journal shall be maintained by each student duly signed by instructor of respective shop.
- 3] Workshop diary/Journal should contain the following:
 - a. Safety precautions in workshop.
 - b. Part Drawings/Designs of the job and procedure/methodology adopted for making
 - i) Job on Carpentry
 - ii) Job on Fitting.
 - iii) Job on Welding.
- 4] Workshop diary/Journal should be certified by the incharge chageman/ foreman.

(Electronics)

Term work consists of Journal containing minimum number of six experiments/assignments.

Sr. No.	Title of Experiment /Assignment/Exercise.	Approximate Hrs required	COs
1	Soldering techniques	02	CO4
2	De-soldering techniques.	02	CO4
3	Cable forming	02	CO4
4	BNC connector soldering.	02	CO4
5	Transformer winding.	04	CO5
6	Testing of transformer.	02	CO5
7	P.C.B fabrication : single sided PCB	04	CO6
8	Assignment on different tools used in electronic workshop	02	CO4
9	Assignment on Surface Mount technology.	02	CO4
10	D-type connecting wiring.	02	CO4

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Jobs on different topics / Demonstration
2. Assignments
3. Case Study/Presentation



9. LEARNING RESOURCES (Mechanical)

Sr. No.	Title Of Book	Author	Publication
1.	Workshop Technology- vol-I	S.K. Hajara Chaudhary-	Media Promoters and Publishers, New Delhi
2.	Workshop Technology	B.S. Raghuwanshi	Dhanpat Rai and Sons, New Delhi
3.	Production Technology	R K Jain	Khanna Publishers, New Delhi
4.	Workshop Technology (manufacturing Processes)	R.S. Khurmi & J.K. Gupta	S. Chand Publications, New Delhi

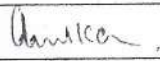
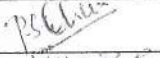

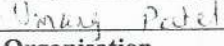

LEARNING RESOURCES (Electronics)

Sr. No.	Title Of Book	Author	Publication
1.	Printed Circuit Boards	Walter C. Bosshart	TMH, New Delhi
2.	Printed circuit workbook series	Clyde F. Coombs Jr.	McGraw Hill
3.	Electronic Component Handbook	Jones, Thomas H.	Reston Publishing

10. WEB REFERENCES

- 1 <http://files.kvsrscse.webnode.in/200000118-deb8cdfb49/carpen%20tools.pdf>
2. https://www.bvrit.ac.in/Freshman_Lab_Manuals/Engineering%20Workshop/Engineering%20Workshop.pdf
3. http://www.bspublications.net/downloads/05229cf9b012a3_workshop_Ch_1.pdf
4. <https://www.wilhelmsen.com/globalassets/marine-products/welding/documents/wilhelmsen-ships-service---unit-or-welding-handbook.pdf>
5. <https://www.weldingtechnology.org>
6. www.sciencebuddies.com
7. www.nptel.iitm.ac.in
8. www.youtube.com
9. www.wikipedia.org
10. <http://www.eleccircuits.com>

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr.A.A.Kulkarni	
2	Internal	Mr.P.S.Dhuri	
3	Internal	Mr.S.C.Kolekar	
4	External	 Organisation KTSCF	



1. COURSE DETAILS

Programme: IE/DE/EXTC	Semester: II
Course: Elements of Electrical Engineering.	Group: C*
Course Code:EEE194703	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
03	02	-	-	05	03	70	20	10	70	25	50	-	175

3. COURSE OBJECTIVES:

A technologist is expected to have some basic knowledge of electrical engineering as they have to work in different engineering fields and deal with various types of electrical machines and equipment. Hence, it is necessary to understand magnetic circuits, AC fundamentals, polyphase circuits, different types of electrical machines, their principles and working characteristics. This course deals with the basic fundamentals of electrical engineering and working principles of Transformer, Dc and single phase Induction motors and their characteristics. The basic concepts of electrical engineering in this course will be very useful for understanding of other higher level courses.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Use electrical equipment in industrial applications.



5. COURSE OUTCOMES (COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
1.	Apply Knowledge of Resistance, resistivity, KCL, KVL, Ohm's law in Electronic circuits.	Remember, Understand, Apply
2.	Use concept of Magnetism and Electromagnetism in Automation and control	Remember, Understand
3.	Use knowledge of AC 1-phase and 3-phase circuits for Electrical and Electronic equipment.	Understand and Apply
4.	Apply Knowledge of D.C motor, single phase Induction motor, generator and transformer for maintenance of Drives.	Understand and Apply

6. COURSE CONTENTS

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	Introduction to Electricity 1.1 Modern Electron Theory, Electric current, EMF, & electric potential, Resistance, Resistivity, Temperature coefficient of Resistance. 1.2 Ohm's Law, resistance in series and parallel (Simple numerical) 1.3 Kirchhoff's current law and voltage law (Simple numerical) 1.4 Work, Power and Energy	08	12	CO1
2	Magnetism & Electromagnetism 2.1 Magnetic flux, magnetic flux density, magnetic field strength mmf, permeability, relative permeability, relations between them, reluctance, permeance, Magnetisation curve. 2.2 Right hand Gripping rule, Maxwell's Corkscrew rule 2.3 Fleming's left hand rule 2.4 Comparison between Electric and Magnetic ckt	06	08	CO1, CO2
3	Electromagnetic Induction 3.1 Faraday's laws of Electromagnetic Induction 3.2 Fleming's left hand rule, Lenz's law 3.3 Dynamically induced Emf, statically induced Emf. 3.4 Concept of self-inductance and mutual inductance.	04	06	CO2



4	Electrostatics 4.1 Atom, Ion, positive and Negative charges, Laws of Electrostatics, Permittivity, Electrostatic induction, Electrostatic field, lines of force, Comparison of electrostatic and magnetic lines of force, Strength of electric field, Flux density, Electric potential, potential difference 4.2 Dielectric strength ,Dielectric constant ,Capacitance, Capacitor types ,Capacitors in series and parallel , Energy stored in a capacitor.	06	09	CO1, CO2
5	A.C. Fundamentals 5.1 Generation of Single Phase Alternating Voltage and current 5.2 Definition of cycle, frequency, angular velocity, Instantaneous value, maximum value, average value, R.M.S. value, Form factor and peak factor. Representation of A.C. quantity by an equation. Phase, phase difference. 5.3 Concept of lagging and leading – by waveforms and phasor diagrams 5.3 A.C. through Resistances	08	12	CO3
6	A.C.3 Phase Circuits 6.1 Generation of Three Phase Alternating Voltage and current 6.2 Star connections of 3 phase A.C. Circuits. Phase and line current, phase and line voltage in star connections 6.3 Delta connections of 3 phase A.C. Circuits, relationship between Phase and line current and phase and line voltage 6.4 Balance & Unbalance load	04	06	CO3
7	D.C.-Generator, Motor, Single Phase Induction Motor 7.1 Working principle of D.C generator & D.C motor 7.2 Constructional Features of D.C generator 7.3 Types of D.C generator & D.C motor 7.4 Characteristics & application of D.C motor 7.5 Single phase Induction motor(general construction and working	06	08	CO4
8	Transformer 8.1 Working principles of Transformer 8.2 Types of Transformer 8.3 EMF equation of Transformer (Simple numerical) 8.4 Voltage ratio, turns ratio, current ratio (Simple numerical) 8.5 Losses in Transformer 8.6 Auto-transformer – comparison with two winding transformer, applications.	06	09	CO4
TOTAL		48Hrs	70	



7. LIST OF EXPERIMENTS AND ASSIGNMENTS

Term Work consists of Journal containing minimum no of Eight experiments and Assignments from the following.

Sr. No.	Title of Experiment	Approx.Hrs required	COs
1	Verification of Kirchoff's Current Law	2	CO1
2	Verification of Kirchoff's Voltage Law	2	CO1
3	Measurement of Inductance by 3 voltmeter method.	2	CO2
4	Measurement of Inductance by 3 Ammeter method	2	CO2
5	3 phase balanced star connection, voltage relations	2	CO3
6	3 phase balanced delta connection, current relations	2	CO3
7	Speed control of D.C Motor	2	CO4
8	Load characteristic of self-excited generator	2	CO4
9	Load characteristic of separately excited generator	2	CO4
10	Regulation of Transformer by direct loading	2	CO4
	Assignments(HomeWork)-		
1	Introduction to Electricity		CO1
2.	A.C. Fundamentals		CO3
3.	A.C.3 Phase Circuits		CO3
4.	D.C.-Generator, Motor, Single Phase Induction Motor		CO4
5.	Transformer		CO4

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Minimum no of practical/assignments.
3. Slides
4. Group discussions
5. Seminar
6. Self Learning Online Resources
7. Any other method adopted

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	V. K. Mehta	Basic Elect Engg	S. Chand & Company
2.	B. L. Thereja (volume I & II)	Electrical Technology	S. Chand & Company
3.	V. N. Mittal	Basic Elect. Engg	Tata Mcgraw- hill



10. WEB REFERENCES

1. www.nptel.iitm.ac.in
2. www.onlinelibrary.wiley.com
3. ewh.ieee.org/soc/es/
4. www.electrical-technologies.com/
5. www.electrical4u.com.

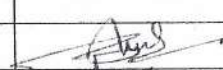
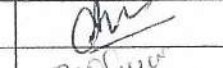
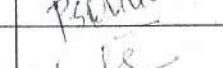

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			Total Marks
		R Level	U Level	A Level	
1.	Introduction to Electricity	3	3	6	12
2.	Magnetism & Electromagnetism	2	4	2	08
3.	Electromagnetic Induction	2	4	—	06
4.	Electrostatics	3	6	—	09
5.	A.C. Fundamentals	4	4	4	12
6.	A.C. 3 Phase circuits	2	2	2	06
7.	D.C generator & D.C motor	2	2	4	08
8.	Transformer	2	3	4	09
TOTAL		20	28	22	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr.N.D.Adate	
2	Internal	Mrs Ajayshree n. Kinhekar	
3	Internal	Mr. Prasad Dhuri	
4	External	M. Narash Nareshe Organisation: V J T I (worked for 10 yrs previously doing Phd)	



1. COURSE DETAILS

Programme: IE/DE/EXTC	Semester: II
Course: Electronic Devices and Circuits –I	Group: C*
Course Code: EDC194704	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
04	2	-	-	06	3	70	20	10	70	25	50	-	175

3. COURSE OBJECTIVE

Diploma engineers have to deal with the various electronic components and devices while maintaining various electronic equipment. The study of basic operating principles and handling of various electronic devices will help them to troubleshoot electronic equipment. This course is designed to enable the students to understand symbol, construction, working and applications of basic electronic devices like diodes and transistor.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences.

- Maintain electronic circuits comprising of discrete electronic components

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to :-

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Use diode and BJT in electronic circuits	Remember, Understand
CO2	Select and use appropriate rectifiers, amplifiers, filters clipper and clamper for intended applications	Understand, Apply
CO3	Recognize the need and application of multistage amplifier	Understand, Apply
CO4	Maintain DC regulated power supply and BJT amplifiers.	Apply



6. COURSE CONTENTS:

Sr.	TOPIC/Sub-topic	Hours	Marks	COs
1	Semiconductor diode characteristics 1.1 Open circuited p.n. junction as a diode, current components in a P.N. diode 1.2 V-I. characteristics and its temperature dependence 1.2.1 Diode resistance 1.3 Transition capacitance 1.4 Junction diode data sheet.	05	06	CO1 CO2
2	Breakdown diodes 2.1 Zener diode 2.2 Schottkey diode 2.3 V-I. characteristics 2.4 Zener diode voltage regulator 2.5 Zener and schottkey diode data sheet	05	04	CO1 CO4
3	Rectifiers and Filters : 3.1 Half wave rectifier 3.2 Full wave rectifiers 3.3 Ripple factor, T.U.F., Ratio of rectification, PIV 3.4 Filters :L.filter, C.filter, L-C, C-L-C, Multiple L-C. and C-R-C. filter their ripple factor with assumptions and voltage regulation. <i>No numerical and derivations to be asked</i>	08	10	CO2 CO4
4	Clipping and Clamping circuits Circuit diagram, working, waveforms and applications 4.1 Series clipper 4.2 Shunt clipper 4.3 Biased clipper: positive, negative, and combination Clamper 4.4 Positive clamper 4.5 Negative clamper	4	5	CO2
5	BJT : 5.1 The junction transistor 5.2 Transistor current components 5.3 Transistor as an amplifier 5.4 Transistor configurations and characteristics 5.5 Graphical analysis of the C.E. configuration. 5.6 Transistor as a switch	10	10	CO1 CO4



6	Transistor biasing and thermal stabilization : 6.1 The operating point 6.2 Effect of temperature on operating point 6.3 Bias stability 6.4 Different biasing circuits and their thermal stability 6.5 Bias compensation techniques <i>No numerical to be asked</i>	10	12	CO1 CO2
7	Transistor at low frequencies : 7.1 Black box theory 7.2 h-parameters 7.3 Small signal low frequency transistor hybrid model. 7.4 Approximate h-equivalent circuit for the three transistor configurations and their comparison	6	5	CO1
8	Frequency response of BJT amplifiers : 8.1 Single stage C.E. amplifier and its frequency response 8.2 Effect of coupling and emitter bypass capacitors on low frequency response of an amplifier 8.3 Gain-bandwidth product	8	8	CO2 CO4
9	Multistage amplifiers : 9.1 Need and definition of Decibel 9.2 Types of coupling 9.2.1. Direct coupled 9.2.2. R.C. coupled 9.2.3 Transformer coupled amplifiers and their frequency response 9.3 Effect of cascading on B.W. and gain (A_v)	8	10	CO4 CO3
TOTAL		64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum no of 12 experiments/Assignments.

Sr. No.	Title of Experiment/Assignment	Approx.Hrs required	COs
1.	Study of CRO.	2	CO1,Co4
2.	Study of P-N junction diode characteristics.	2	CO1
3.	Study of Zener diode characteristics.	2	CO1,CO4
4.	Study of Zener diode as voltage regulator.	2	CO1,CO4
5	Study of Half wave full wave rectifier with and without filter.	2	CO3
6	Study of I/P and O/P characteristics of C.B. configuration.	2	CO1, CO4
7	Study of I/P and O/P characteristics of C.E. configuration.	2	CO1, CO4
8	Study of Clamping and clipping circuits	2	CO3
9	Study of C-E amplifier frequency response	2	CO4
10	Study of Coupling and bypass capacitors.	2	CO4
11	Study of Two stage R-C coupled amplifier frequency response	2	CO3, CO4
12	Study of Operating point and AC/DC load line.	2	CO3,CO4
13	Study of C.B. amplifier	2	CO3,CO4
14	Measurement of C.E. h-parameters.	2	CO3
15	Assignments on Diode/Rectifiers/Filters/Transistors		
15.1	Assignment on diode	HA	CO1
15.2	Assignment on rectifier	HA	CO2
15.3	Assignment on Clipper and Clamper	HA	CO3
15.4	Assignment on BJT	HA	CO1,CO4
15.5	Assignment on h parameter	HA	CO3

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Minimum no of practical/assignments etc.
3. Guest Lectures
4. Slides
5. Self-Learning Online Resources

9. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	V.K. Mehta	Principles of electronics Engg.	S. Chand
2	Robert Boylested	Electronic devices and circuits theory	PHI, New Delhi
3	N.N. Bhargava	Basic electronics and linear circuits	TTTI, Chandigarh TMH, New Delhi

10. WEB REFERENCES

1. www.electronics-tutorials.com
2. www.coursera.org
3. www.nptel.ac.in
4. www.falstad.com/circuit/e-index.html



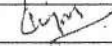

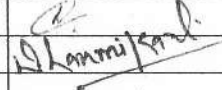

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Semiconductor diode characteristics	2	4	-----	6
2	Breakdown diodes	2	2	-----	4
3	Rectifiers and Filters	2	6	2	10
4	Clipping and Clamping circuits	2	2	-----	4
5	BJT	4	4	2	10
6	Transistor biasing and thermal stabilization	4	2	4	10
7	Transistor at low frequencies	2	4	2	8
8	Frequency response of BJT amplifiers	2	2	6	10
9	Multistage amplifiers	-----	4	4	8
TOTAL		30	20	20	70

R Remember, U Understand, A Apply and above, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mrs. P.J. Nikhade	
2	Internal	Mr.S.S. Rokade	
3	Internal	Mr. L.B. Deshpande	
4	External	Mr. Umang Patil Organisation: K.J. Somaiya College of Engg.	



1. COURSE DETAILS

Programme: IE/DE/EXTC Course: Principles of Digital Techniques Course Code: PDT194705	Semester: II Group: C* Duration :16 Weeks
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2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSI	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	2	-	-	5	3	70	20	10	70	25	50	-	175

3. COURSE OBJECTIVE

Digital device technology plays a very important role in the modern world. Digital circuits are used in various day to day applications like toys, computers, calculators, satellites, microwave ovens, cellular phones etc. The digital systems with some kind of human interface will perform highly complex tasks with very high reliability and speed, unattainable by any other means. This course enables the students to learn the basic principles used in digital systems.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain following industry identified skill through various teaching learning experiences

- Test, design digital circuits and write expressions

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	Use digital circuits and numbering systems.	Remember, Understand
2	Use digital logic circuits	Remember, Understand, Apply
3	Compare different digital circuits.	Understand, Apply
4	Design digital circuits.	Apply, Understand
5	Test and maintain digital circuits	Understand ,Apply, Design



6. COURSE CONTENTS:

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	Number system and codes 1.1 Binary 1.2 Octal 1.3 Hexadecimal 1.4 BCD 1.3 Gray	3	6	CO1 CO2
2	Basic logic gates, Universal gates : 2.1 Boolean algebra 2.2 DeMorgan's Theorems	2	4	CO1 CO2
3	Arithmetic elements : 3.1 Half adder, Full adder 3.2 Half subtractor, Full subtractor 3.3 1's complement, 2's complement subtraction 3.4 BCD adder	4	11	CO2 CO3 CO4
4	Design of combinational circuits : 4.1 K Map 4.2 SOP and POS forms of equations 4.3 Min terms, Max terms 4.4 Design of circuits using universal gates	6	6	CO2 CO3 CO4 CO5
5	Study of MSI, LSI circuits : 5.1 Decoders, Encoders 5.2 Multiplexers, Demultiplexer 5.3 4 bit parallel adder 5.4 4 bit comparator 5.5 Parity generator, checker	9	8	CO3 CO4 CO5
6	Sequential circuits : 6.1 Difference between combinational and sequential circuits. 6.2 Triggering of sequential circuits. 6.3 Flip flops – R-S, J-K-T, and D types. 6.4 Counters – Synchronous and asynchronous basic concept and design using excitation tables of flip flops e.g. Binary, BCD, Up/Down, Pre settable counters. 6.5 Four digit up/down counter IC 7217.	10	14	CO2 CO3 CO4 CO5



7	Semi-conductor memories: 7.1 Random Access Memory : Static memory cell, 7.2 Dynamic memory cell, Internal organization, Read/Write operation. 7.3 Read Only Memory: Erasable Programmable ROM, EEPROM. 7.4 Memory Expansion – Serial and parallel expansion. 7.5 Study of memory ICs.	4	5	CO2 CO3
8	Logic families: 8.1 Comparative study of different logic families like TTL, CMOS, ECL etc. considering following characteristics: Logic levels, Power dissipation, Fan in / Fan out, Noise immunity, Speed of operation. 8.2 Interfacings of ICs of different logic families.	2	3	CO2 CO3
9	Study of A/D & D/A Converters : 9.1 Study of Analog to Digital conversion techniques -successive approximation A/D converter – Dual slope A/D conversion, -Flash A/D conversion 9.2 Study of Digital to Analog conversion -Binary weighted resistor method, -R-2R, Ladder method	8	13	CO3 CO4 CO5
TOTAL		48	70	

7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum no of 12 experiments/Assignments .

Sr. No.	Title of Experiment/Assignment	Approx.Hrs required	COs
1	Verification of De-Morgan's theorem	2	Co1,CO2,CO5
2	NAND as a universal gate.	2	CO1,CO2,CO4
3	NOR as a universal gate.	2	CO1,CO2,CO4
4	Study of half and full adders.	2	CO5
5	Study of decoder.	2	CO5
6	Study of BCD to seven segment decoder/driver.	2	CO5
7	Study of multiplexer.	2	CO2,CO5
8	Designing of combinational circuit.	2	CO5
9	Study of JK flip-flop.	2	CO3,CO5
10	Study of D type flip flop	2	CO5
11	Study of decade counter.	2	CO5,CO2
12	Study of four bit parallel adder.	2	CO5,CO2
13	4-bit comparator.	2	CO5,CO2
14	Study of ALU	2	CO5
15	Shift Register.	2	CO2,CO5



8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Minimum no of practical/assignments etc.
3. Industry visit
4. Guest/Expert lectures
5. Demonstrations/Simulations
6. Slides
7. Group discussions
8. Seminar
9. Case Study
10. Self-Learning Online Resources
11. Any other method adopted

9. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1.	Albert Paul Malvino & Donald P. Leach	Digital Principles & Application	Mc-Graw Hill International
2.	Morris Mano	Digital Logic & Computer Design	PHI, New Delhi
3.	James Bignell & Robert Donovan	Digital Electronics	Delmar & Thomson Learning
4.	TTL Data Sheets	-	-
5.	Intersil Data Sheets	-	-
6.	National Semi-conductor Data Sheets	-	-
7.	R.P. Jain.	Modern Digital Electronics.	TMH

- ## 10. WEB REFERENCES
- www.nptel.ac.in
www.alldatasheet.com



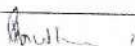


11. 3SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Number system and codes	3	3		6
2	Basic logic gates, Universal gates :	2	2		4
3	Arithmetic elements	2	5	4	11
4	Design of combinational circuits :		3	3	6
5	Study of MSI, LSI circuits :	3	5		8
6	Sequential circuits :	4	4	6	14
7	Semi-conductor memories	3	2		5
8	Logic families	3			3
9	Study of A/D & D/A Converters	4	3	6	13
		24	27	19	70

R Remember, U Understand, A Apply and above, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mrs. A. A. Kulkarni	
2	Internal	Mr S. S. Rokade	
3	Internal	Mr L. B. Deshpande	
4	External	Ms. Peagati Samudee Organisation: V.J.T.I.	