Shri Vile Parle Kelavani Mandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Vile Parle (West), Mumbai-400 056

Department of **ELECTRICAL ENGINEERING**

Three Years Full Time Diploma with Inplant Training

In

ELECTRICAL ENGINEERING

CURRICULUM

Semester Pattern

(Effective from June' 2019)

Head
Electrical Engineering Department
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Approved Copy

Curriculum Co-Ordinator / COE

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400 056.

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

Shri Vile-Parle Kelavani Mandal's

Shri Bhagubhai Mafatlal Polytechnic

Mumbai-400056

(AN ACADEMICALLY AUTONOMOUS GRANT-IN AID INSTITUTE)

CURRICULUM 2019

DIPLOMA PROGRAMME
IN
ELECTRICAL ENGINEERING

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC ★ MUMBAI 400 056.

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PREFACE

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC started three year diploma programs and was affiliated to the Board of Technical Examinations, Maharashtra State, in 1963. The institute has been conferred an academic autonomous status since 1969 by Government of Maharashtra because of excellent performance, which enabled it to design the curriculum and examination scheme and to introduce inplant training, which involved industry-institute interaction. Thus, four year semester sandwich pattern came into existence. Since 1978-79, academic freedom was extended to all the full-time diploma programs. In 1989-90 full autonomy was granted to all the seven full-time diploma programs.

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 programs, which includes full-time diploma, part-time diploma and post-diploma programs. 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, the curriculum is revised and is converted to three-year diploma program. 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 program of three-year duration with inplant training in fifth semester and Choice and Credit based (CCBS) system is adopted from 2019

The Vision of the institute is to be a premier Technical Training and Development institute catering to the skill and professional development in multi-domain for successful employment / self employment by offering need based curriculum and state of the art infrastructure.The institute shall be the center for excellence in skill development and community development through different training programmes, incubation centre and Entrepreneurship Development. For this the institute is committed to provide education for skill development, engineering diploma and continuing education programmes for enhancement of employability skills of the aspirants in the job/self-employment through continually developing quality learning systems. The institute aims at holistic and student centric education in collaboration with industry and having practice based education. To achieve this continuous efforts are made to design the curriculum considering the latest development in the industrial sector and technology.

Diploma Programme in ELECTRICAL ENGINEERING (Aided)

For designing the curriculum, various domains have been identified like Power sector, service and maintenance, manufacturing and Production, enterprises. Feedback from all the stakeholders i.e industries, teachers, students and parents have been collected for shaping the need based curriculum. The entire scheme and content is compared with AICTE/MSBTE/Autonomous Polytechnic/and with SBMP 2016. The said syllabus has been discussed and finalized in the subsequent Programme Board of Studies and Board of Studies and with final approval of Managing Council.

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC ★ MUMBAI 400 056.

INPLANT TRAINING:

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

In this Curriculum-2019, the student has to acquire 180 credits for successful completion of Diploma Programme. The courses of curriculum are structured at 4 different levels i.e. Basic Courses, Core Courses, Application Courses, and Management Courses.

The minimum entry level is 10th. However, the curriculum provides Choice and Credit based (CCBS) entry and for the students opting admission after passing 12th, ITI, MCVC. And the students will get exemptions in certain courses as per the rules.

There is a flexibility for opting the courses as per the choice of students. The curriculum provides **"Sample Path"** as a guideline for selection of courses in each term for entry level as 10th. The List of Courses for Award of Class after completion of Diploma Programme is prescribed separately in this curriculum.

The fulfillment of programme outcome as stated in the Curriculum-2019 will depend on its effective implementation. The teachers who are implementing the curriculum were also involved in the design process of curriculum, hence, I hope that the Curriculum-2019 will be implemented in effective way and the pass outs will acquire the requisite knowledge and skills to satisfy the industrial needs.

(Dr. M.Z.SHAIKH)
Principal
Shri Bhagubhai Mafatlal Polytechnic,Mumbai

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC ★ MUMBAI 400 056.

Shri Vile-Parle Kelavani Mandal's

Shri Bhagubhai Mafatlal Polytechnic

Vile Parle (W), Mumbai-400056

VISION

SBM Polytechnic aspires to be the Lead Institute in providing need based Technical Education

MISSION

- To provide state of art infrastructure and latest equipment for providing a stimulating learning environment.
- To prepare students to meet the dynamic needs of the industry by periodic reviewing and up gradation of curriculum through an interactive process with industry.
- To inculcate a spirit of excellence in terms of academic performance, research and innovation in faculty by providing appropriate support and incentive systems.
- To promote and support co- curricular, extra-curricular activities and industry interaction to make students socially sensitive and employable.

ELECTRICAL ENGINEERING DEPARTMENT

VISION

To create Electrical Professionals with technical competencies and social values to serve industry and society.

MISSION

- **M-1-** To impart industry oriented Technical Education to enhance the employability of Electrical engineering graduates.
- **M-2-** To create an ecosystem for developing Entrepreneurial skills.
- **M-3-** To enhance industry-institute relationship for lifelong learning.

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC ★ MUMBAI 400 056.

JOB PROFILE OF ELECTRICAL DIPLOMA PASSOUTS

We hope this outcome-based curriculum 2019-21 will fulfill the requirements of all the stakeholders through effective implementation and satisfy the industrial and academic need of the students and Student with Diploma in Electrical Engineering get good opportunities to carry out various activities in various areas like

- Power Sector (Generation, Transmission and Distribution)
- Renewable energy sector
- Service and Maintenance
- Manufacturing and Production
- Public Sector
- Private Sector
- Entrepreneurship
- Technical Education

After successful completion of Diploma Programme in Electrical Engineering students can work as

1. Technician
2. Supervisor
3. Electrical Contractor
4. Sub-Engineer at MAHAGENCO,MAHATRANCOM,MAHADISCOM and other state and private utility companies
5. Maintenance Engineer in small and medium enterprises
6. Instructor in various electrical workshops and laboratories
7. Service Engineer
8. Quality Assurance Supervisor
9. Production supervisor
10. Test Engineer
11. Store/Purchase Officer
12. Sales and Marketing Engineer
13. Entrepreneur
14. Lab Assistant in Various Diploma Engineering Colleges.

DIPLOMA PROGRAMME IN ELECTRICL ENGINEERING

RATIONALE

Electrical Engineering Programme is the core branch of Engineering, which emphasizes on the courses like Electrical Power Generation, Electrical Engineering materials, Estimation & Costing, Electrical Machines, and Transmission & Distribution etc. In addition of these students are acquainted with courses like Power Electronics, Industrial Instrumentation, Utilisation of Electrical Energy, Electric Traction and Drives etc.

To develop the overall personality of the students courses like Industrial Management and Entrepreneurship Development are being offered.

In the curriculum students need to earn 180 i.e (160 +20 Inplant) credits for successful completion of Diploma Programme

The courses of the curriculum are grouped at 4 levels viz. Basic, Core, Management and Application courses and Industrial Training is incorporated at 5th semester for enhancing the practical skills

The minimum entry level is 10th, however the curriculum provides "Choice and Credit based System (CCBS) for the students opting admission as a lateral entry i.e 12th. ITI, MCVC where in students are entitled to get the exemption in certain courses as per the rules. Also there is flexibility of opting the courses as per the choice of the student.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- PEO1: Diploma Electrical Engineering Graduates will solve electrical engineering problems with acquired technical and soft skills.
- PEO2- Diploma Engineering Graduates will be able to work individually & in a team in multidisciplinary environment.
- PEO3- Diploma Graduates will become successful Entrepreneur having sense of social responsibilities.

PROGRAMME OUTCOMES (POs)

On Successful Completion of Diploma Programme in Electrical Engineering, the pass outs will be able to,

1. **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

2. **Problem analysis:** Identify and analyse well-defined engineering problems using codified standard methods.

3. **Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

4. **Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

5. **Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.

6. **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

7. **Life-long learning**: Ability to analyse individual needs and engage in updating in the context of technological changes.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On successful completion of Diploma Programme in Electrical Engineering**, the student will be able to,**

- **PSO1-** Demonstrate the responsibilities as an Electrical supervisor in various sectors using various tools and techniques for best run of the plant.
- **PSO2-** Design, operate, Test electrical installations and Maintain electrical machines with technical knowledge & skills.

MAPPING OF MISSION AND PROGRAMME EDUCATIONAL OBJECTIVES

Sr. No.	Mission	Component of Mission Statement	PEO1	PEO2	PEO3
1	M1	To impart industry oriented Technical Education to enhance the employability of Electrical engineering graduates.	3	2	2
2	M2	To create an ecosystem for developing Entrepreneurial skills.	2	3	3
3	M3	To inculcate moral values and professional ethics	1	1	2

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES AND PROGRAMME OUTCOMES

Sr. No.	Programme Educational Objectives (PEOs)	Programme Outcomes (POs)
1	PEO 1: Diploma Electrical Engineering Graduates will solve electrical engineering problems	I, II, III, VII
2	PEO 2- Diploma Engineering Graduates will be able to lead various organization with acquired electrical domain knowledge.	I,V,VI,VII
3	PEO3- Diploma Graduates will become successful Entrepreneur having sense of societal responsibilities.	IV,V

MAPPING OF PROGRAMME SPECIFIC OUTCOMES AND PROGRAMME OUTCOMES

Sr. No.	Programme Specific Outcomes (PSOs)	Programme Outcomes (POs)
1	PSO1- Demonstrate the responsibilities as an Electrical supervisor in various sectors using modern tools and techniques for best run of the plant.	I,IV,V,,VII
2	PSO2- Design, execute and maintain electrical installations with technical knowledge & skills.	I,II,III,VI

MAPPING OF PROGRAMME OUTCOME AND COURSES

PO No.	Program Outcome (POs)	Course Name
1	**Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.	Basic Mathematics, Engineering Mathematics Applied Mathematics Applied Physics , Applied Chemistry Engineering Drawing DC Circuit Fundamentals AC Circuit Fundamentals Electrical Circuits and Networks Electrical Power Generation Electrical Transmission and Distribution Transformers and Induction Motors DC and Synchronous Machines Utilisation of Electrical Energy Inplant Training Electrical Testing and Maintenance Traction and Drives Industrial Instrumentation
2	**Problem analysis:** Identify and analyse well-defined engineering problems using codified standard methods.	DC Circuit Fundamentals AC Circuit Fundamentals Basic Electronics Electrical Materials and Appliances Electrical Circuits and Networks Electrical Transmission and Distribution Electrical Testing and Maintenance Inplant Training

3	**Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.	Environmental Studeis Engineering Mathematics Electrical Materials and Appliances Traction and Drives Inplant Training
4	**Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.	Basic Electronics Workshop Practice Transformers and Induction Motors Electrical and Electronics Measurements DC and Synchronous Machines Electrical Testing and Maintenance
5	**Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.	Environmental Studies Development of Life skills Workshop Practice Electrical Power Generation Electrical Estimation and Costing Utilisation of Electrical Energy Inplant Training
6	**Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.	Communication Skills Development of Life skills Electrical Estitimation and Costing Industrial Management Project Power Electonics Inplant Training
7	**Life-long learning:** Ability to analyse individual needs and engage in updating in the context of technological changes.	Basic Mathematics, Applied Mathematics Communication Skills Development of Life skills Electrical Testing and Maintenance Project Inplant Training

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TEACHING AND EXAMINATION SCHEME

PROGRAMME: DIPLOMA - ELECTRICAL ENGINEERING
SEMESTER: I

With effect from batch admitted June, 2019(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	Paper	TW	PR	OR	TTL		
1	Basic Mathematics (BMT 190002)	3	-	-	2	5	03	70	20	10	70	25	-	-	125	B*	3/2/5
2	Applied Physics (APH 190010)	4	2	-	-	6	01	@70	20	10	70	25	50	-	175	B*	4/2/6
3	Environmental Studies (EVS190003)	2	-	-	-	2	-	-	-	-	-	50	-	-	50	B*	2/0/2
4	Communication Skills (CMS 190011)	3	-	-	1	4	03	70	20	10	70	25	-	-	125	B*	3/1/4
5	Engineering Drawing (EDG 190007)	2	2	2	-	6	-	-	-	-	-	50	50	-	100	C*	2/4/6
6	DC Circuits Fundamentals (DCF 190301)	3	2	-	-	5	03	70	20	10	70	25	50	-	175	C*	3/2/5
		17	06	02	03	28	No of Papers =04		80	40	280	200	150	-	750		17/11/28
TOTAL PERIODS = 28								TOTAL MARKS = 750									

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**

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056

Shri Vile Parle Kelavani Mandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

PROGRAMME: DIPLOMA - ELECTRICAL ENGINEERING
SEMESTER: II

With effect from batch admitted June, 2019(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	Paper	TW	PR	OR	TTL		
1	Engineering Mathematics (EMT 190009)	3	-	-	2	5	03	70	20	10	70	25	-	-	125	B*	3/2/5
2	Applied Chemistry (ACH190002)	4	2	-	-	6	01	@70	20	10	70	25	50	-	175	B*	4/2/6
3	Development of Life skills (DLS 190004)	2	-	-	1	3	-	-	-	-	-	50	-	50	100	B*	2/1/3
4	Basic Electronics (BEX 190302)	4	2	-	-	6	03	70	20	10	70	25	50	-	175	B*	4/2/6
5	Electrical Materials & Appliances (EMA 190303)	3	2	-	-	5	03	70	20	10	70	25	-	25	150	C*	3/2/5
6	AC Circuits Fundamentals (ACF190304)	3	2	-	-	5	03	70	20	10	70	25	50	-	175	C*	3/2/5
7	Workshop Practice (EE) (WPE190305)	-	4	-	-	4	-	-	-	-	-	50	-	-	50	C*	0/4/4
		19	12	-	03	34	No of Papers =05		100	50	350	225	150	75	950		19/15/34
TOTAL PERIODS = 34								TOTAL MARKS = 950									

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**

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Shri Vile Parle Kelavani Mandal's

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

PROGRAMME: DIPLOMA - ELECTRICAL ENGINEERING **With effect from batch admitted June, 2019(Progressively)**
SEMESTER: III **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	Paper	TW	PR	OR	TTL		
1	Applied Mathematics (AMT190013)	3	-	-	1	04	03	70	20	10	70	25	-	-	125	C*	3/1/4
2	Electrical Circuits and Networks (ECN 190306)	4	2	-	-	06	03	70	20	10	70	25	50	-	175	C*	4/2/6
3	Electrical Power Generation (EPG 190307)	4	-	2	-	06	03	70	20	10	70	50	-	-	150	C*	4/2/6
4	Electrical Transmission and Distribution (ETD 190308)	4	-	2	-	06	03	70	20	10	70	50	-	25	175	C*	4/2/6
5	Transformer and Induction Motors (TIM190309)	4	2	-	-	06	03	70	20	10	70	25	50	-	175	C*	4/2/6
6	Digital Electronics (DEX190310)	4	2	-	-	06	03	70	20	10	70	25	25	-	150	A	4/2/6
7	'C' Programming (CPR190019)	2	4	-	-	06	-	-	-	-	-	50	50	-	100	C	2/4/6
		25	10	04	01	40	No of Papers =06		120	60	420	250	175	25	1050		25/15/40
TOTAL PERIODS = 34/40									TOTAL MARKS = 1050								

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**

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
TEACHING AND EXAMINATION SCHEME

PROGRAMME: DIPLOMA - ELECTRICAL ENGINEERING
SEMESTER: IV

With effect from batch admitted June, 2019(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	Paper	TW	PR	OR	TTL		
1	Electrical & Electronics Measurements (EEM190311)	4	2	-	-	06	03	70	20	10	70	25	25	-	150	C*	4/2/6
2	DC & Synchronous Machines(DSM190312)	4	2	-	-	06	03	70	20	10	70	25	25	-	150	C*	4/2/6
3	# Switchgears & Protection (SGP190313)	4	-	2	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
4	# Electrical Estimation & Costing (EEC190314)	4	-	2	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
5	**# Elective –I (Any one)**																
5.1	Utilisation of Electrical Energy (UEE190315)	4	2	-	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
5.2	Renewable Energy Sources (RES 190316)	4	2	-	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
6	Entrepreneurship Development (EDP 190017)	2	2	-	-	04	-	-	-	-	-	50	-	-	50	M	2/2/4
7	Stress Management (STM 190012)	-	2	-	-	02	-	-	-	-	-	-	-	-	-	M	0/2/2
		22	10	04	-	36	No of Papers = 05		100	50	350	250	50	150	950		22/14/36
TOTAL PERIODS = 32/34/36							TOTAL MARKS = 950										

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

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056.

Shri Vile Parle Kelavani Mandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

PROGRAMME: DIPLOMA - ELECTRICAL ENGINEERING **With effect from batch admitted June, 2019 (Progressively)**

SEMESTER: V

#INPLANT TRAINING

Sr No	Course Name (code)	Training Duration	Credits		Weekly Report	Quiz Test	Dissertation (Report)	Oral/Viva	Total	Group (Gr)
1	# Inplant Training	26Weeks **	20	**Maximum Marks**	50	50	50	50	200	A*
	(IPT 190324)			**Minimum Marks**	20	20	20	20	80	

****Total Inplant Training Duration 26 weeks equal to 24 weeks actual training plus 2 weeks examination and processing**

*Compulsory, # Award Winning, Weekly Report and Quiz Test are assessed by Internal Examiner Only, Dissertation and Oral/Viva are Assessed by Internal and External Examiner Jointly

Gr- Group, B - Basic, C - Core, A - Application, M - Management

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

PROGRAMME: DIPLOMA - ELECTRICAL ENGINEERING **With effect from batch admitted June, 2019(Progressively)**

SEMESTER: VI **Duration: 16 Weeks**

Sr. No.	Course Name (Code)	Theory Paper Duration and Marks (ESE)					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	Paper	TW	PR	OR	TTL		
1	# Industrial Management (IMG 190014)	3	-	-	-	03	03	70	20	10	70	-	-	-	100	M*	3/0/3
2	# Power Electronics (PEX 190317)	4	2			06	03	70	20	10	70	50	50	-	200	A*	4/2/6
3	# Project (PRJ 190318)	-	6	-	-	06	-	-	-	-	-	50	-	50	100	A*	0/6/6
4	# Electrical Testing & Maintenance (ETM 190319)	4	2	-	-	06	03	70	20	10	70	50	50	-	200	A*	4/2/6
5	**# Elective –II (Any one)**																
5.1	Traction & Drives (TDR 190320)	4	2	-	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
5.2	Industrial Automation (INA190321)	4	2	-	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
6	Industrial Instrumentation (INI 190322)	4	2	-	-	06	03	70	20	10	70	25	-	50	175	A	4/2/6
7	Principles of Control System (PCS 190323)	4	2	-	-	06	03	70	20	10	70	25	-	50	175	A	4/2/6
		23	16	-	-	39	No of Papers=06		120	60	420	250	100	200	1150		23/16/39
TOTAL PERIODS = 33/39									TOTAL MARKS = 1150								

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.

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Shri Vile Parle Kelavani Mandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

LIST OF AWARD WINNING COURSES

PROGRAMME: DIPLOMA - ELECTRICAL ENGINEERING **With effect from batch admitted June, 2019(Progressively)**

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	Industrial Management (IMT 190014)	3	-	-	-	03	03	70	20	10	70	-	-	-	100	M*	3/0/3
2	Electrical Estimation & Costing (EEC190314)	4	2	-	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
3	Electrical Testing & Maintenance (ETM190319)	4	2	-	-	06	03	70	20	10	70	50	50	-	200	A*	4/2/6
4	Power Electronics (PEX 190317)	4	2			06	03	70	20	10	70	50	50	-	200	A*	4/2/6
5	Switchgears & Protection (SGP190313)	4		2		06	03	70	20	10	70	50	-	50	200	A*	4/2/6
6	Project (PRJ 190318)	-	6	-	-	06	-	-	-	-	-	50	-	50	100	A*	0/6/6
7	**Elective –I (Any One)**																
7.1	Utilisation of Electrical Energy (UEE190315)	4	2	-	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
7.2	Renewable Energy Sources (RES 190316)	4	2	-	-	06	03	70	20	10	70	50	-	50		A*	4/2/6
8	**Elective –II (Any One)**																
8.1	Traction & Drives (TDR 190320)	4	2	-	-	06	03	70	20	10	70	50	-	50	200	A*	4/2/6
8.2	Industrial Automation (INA190321)	4	2	-	-	06	03	70	20	10	70	50	-	50		A*	4/2/6
9.0	# Inplant Training (IPT 190324)	-	-	-	-	20	-	-	-	-	-	50	-	50	100		0/20/20
	TOTAL	**27**	**16**	**02**	-	**65**	**No.of Papers = 07**		**140**	**70**	**490**	**400**	**100**	**300**	**1500**		**27/38/65**

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

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Shri Vile Parle Kelavani Mandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

Credit Summary for Scheme -2019-21

Programme : DIPLOMA - ELECTRICAL ENGINEERING

Gr.	Semester –I		Semester –II		Semester –III		Semester –IV		Semester –V		Semester –VI		Total
	C	O	C	O	C	O	C	O	C	O	C	O	
Basic	17	-	20	-	-	-	-	-	-	-	-	-	37
Core	11	-	14	-	28	06	12	-	-	-	-	-	71
Management	-	-	-	-	-	-	-	06	-	-	03	-	09
Application	-	-	-	-	-	06	18		20	-	24	12	80
Sub Total	28	-	34	-	28	12	30	06	20	-	27	12	197
Total	28		34		40		36		20		39		197

C : Compulsory and O : Optional

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Shri Vile Parle Kelavani Mandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Vile Parle (W) Mumbai- 400056

Programme : DIPLOMA - ELECTRICAL ENGINEERING **With effect from :June 2019**

Credit Summary

Group	Maximum Credit	Compulsory Credit	Optional Credit	Remark
Basic	37	37	-	
Core	71	65	06	
Management	09	03	06	
Application	60	42	18	
Total	177	147	30	

Compulsory Credits : 147

Optional Credits : 30

Inplant Training Credits : 20

Total Credits : 147+30+20= 197

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Shri Vile Parle Kelavani Mandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Vile Parle (W) Mumbai- 400056

RATIO OF THEORY : PRACTICAL		
Total Theory Credits Offered	Total Practical Credits Offered	Theory : Practical
106	91	55 :45
Total Theory Credits (Award Winning)	Total Practical Credits (Award Winning)	
27	38	40:60
Total TH/SSL Exam Marks for Offered Courses	Total TA/TW/PR/OR Exam Marks for Offered Courses	
2340	2610	47 :53
Total TH/SSL Exam Marks for Award Winning Courses	Total TA/TW/PR/OR Exam Marks for Award Winning Courses	
630	870	42:58

Semester	Total Credits/Marks offered			
	Theory Credits	Marks	Practical Credits	Marks
Semester I	17	360	11	390
Semester II	19	450	15	500
Semester III	25	540	15	510
Semester IV	22	450	14	500
Semester V	-	-	20	100
Semester VI	23	540	16	610
Total	106	2340	91	2610

Award winning Credits/Marks			
Theory Credits	Marks	Practical Credits	Marks
-	-	-	-
-	-	-	-
-	-	-	-
12	270	06	330
-	-	20	100
15	360	12	440
27	630	38	870

Head of Department

Controller of Examination

Secretary CDC

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056.

Principal

PROGRAMME- DIPLOMA IN EECTRICAL ENGINEERING

SAMLE PATH SCHEME – 2019

ENTRY LEVEL= 10th +

Nature of Course	SEM I	SEM II	SEM III	SEM IV	SEM V	SEM VI	Total
Compulsory	BMT (05)	EMT (05)	AMT (04)	EEM (06)	IPT (24 Weeks)	IMT (03)	
	CMS (04)	DLS (03)	ECN (06)	DSM(06)		PEX (06)	
	APH (06)	ACH (06)	EPG (06)	SGP(06)		PRJ (06)	
	EVS (02)	EMA (05)	ETD(06)	EEC (06)		ETM (06)	
	EDG (06)	WPE(04)	TIM (06	--		TDR (06)	
	DCF (05)	ACF (05)	--	--		--	
	--	BEX(06)	--	--		--	
Total Credits	**28**	**34**	**28**	**24**	**20**	**27**	**161**
Optional/ Elective	---	---	**Optional (Any One)** CPR (06) DEX (06)	**Optional (Any One)** EDP (04) STM (02)	-	**Elective –II (Any One)**	
				Elective –I (Any One)			
				UEE (06)		PCS (06)	
				RES (06)		INI (06)	
Total Optional Credits	-	-	06	02	-	-	08
Total Credits Electives	-	-	-	06	-	06	12
Total Courses	06	07	06	06	-	06	31
Total Credits (C+O+E)	**28**	**34**	**34**	**32**	**20**	**33**	**181**
						Grand Total of Credits	**181**

C: Compulsory, O: Optional, E: Elective courses

1. COURSE DETAILS

Programme: CE/ME/EE/IE/PL/CH/DE	Semester: I
Course: Basic Mathematics	Group: B*
Course Code: BMT190001	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	-	-	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/IE/PL/CH/DE	Semester: I / II
Course: APPLIED PHYSICS	Group: B*
Course Code:APH190010	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	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'SLEVEL
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 : 2.2.1Molecular 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 : 2.3.1Fluid 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, convention 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, aerial and cubical expansion and relation between them (no derivation) 3.2Temperature : 3.2.1Boyle's law, Charle's law, Gay Lussac's law. 3.2.2Absolute 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 (Cp and Cv), the three gas laws, determination of specific heats of different materials. 3.2.4 Temperature measurement : Optical pyrometer, Thermoelectric thermometer	**05**	**06**	**CO1** **CO 2** **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 4.2.1Defination of Wave motion, amplitude, period, frequency and wavelength. 4.2.2 Relation between velocity, frequency, and wavelength. 4.2.3Equation 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 : 4.3.1Defination 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** **CO 4**

5.0	**5.OPTICS** 5.1 Photoelectric effect : 5.1.1 Statement of photoelectric effect, Planck's hypotheses, Einstein's equation. 5.1.2 Definition: Threshold wavelength, Threshold frequency, Work function. 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. 5.1.4 Characteristics of photoelectric effect. 5.1.5 Photocells: Photo emissive, photoconductive, photovoltaic. 5.1.6 Engineering applications. 5.1.7 Numerical on energy of photon, work function, Einstein's equation. 5.2 Interference : 5.1Interference of light, Interference pattern. Constructive interference, Destructive interference. Steady interference of light. 5.2.2Conditions for steady interference pattern 5.2.3 Newton's rings, Newton's rings setup,Wavelength of source of light (No derivation) 5.2.4Optical flatness, Engineering Applications Fiber optics Total internal reflection, optical fiber-step index and graded index, Applications. 5.3 Diffraction : 5.3.1 Diffraction of light, Diffraction at a slit, 5.3.2 Diffraction Grating, Characteristics of grating spectra. 5.4 Polarization : 5.4.1 Polarization of light, Definition : Plane of polarization, plane of vibration 5.4.2 Explanation of polarization of light, Nicol prism. 5.4 X-rays : 5.4.1 Production of X-rays, types of X-ray spectra-continuous and characteristics, 5.4.2 X-ray wavelength (simple Problems), properties of X-rays. 5.4.3 Applications of X-rays.	**11**	**11**	**CO 1** **CO 2** **CO 3**

6.0	**6.0 ELECTRICITY AND MAGNETISM** 6.1 Coulomb's law , Intensity and Potential : 6.1.1 Coulomb's inverse square law for electric charges, Electric fields, Intensity of electric field. 6.1.2 Electric line of forces, Properties of electric line of forces. 6.1.3 Electric flux, Electric flux density, Relation between flux density and Intensity of electric field. 6.1.4 Electric potential, Absolute electric potential. Numerical problems. 6.2 Capacitor : 6.2.1 Capacity of conductor, Definition: Capacitance, Farad. 6.2.2 Capacitance of Spherical conductor, Principle of capacitor (condenser). 6.2.3 Capacitors in series and parallel, Expression for the energy stored, 6.2.4 Numerical on capacitor. 6.3 Current electricity : 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 . 6.4 Magnetic materials : 6.4.1 Modern concepts of magnetism, Dia, Para, Ferromagnetism, 6.4.2 Testing of magnetic materials , Current carrying conductor in magnetic field, 6.4.3 Shunt, Moving coil galvanometer.	**10**	**10**	**CO 1** **CO 2** **CO 4**

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. LISTOF PRACTICALS/ASSIGNMENTS

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

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.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.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://wwwyoutube.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=y_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/CHE/DE	**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 RESOURSES

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	
2	Internal	K.P.Bhave	
3	Internal	R.D.Shimpi	
4	External	Dr. S. Arvi	
		Organaisation: Mucchala Polytechnic Thane	

1. COURSE DETAILS: Communication Skills

Program: CE/ME/ EE/IE/PE/CH/DE	**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							
Theory Hrs	Practical Hrs	Drawing Hrs	Tutorial Hrs	Credits (L+P+D+T)	Theory Paper Duration and Marks		SSL	TA	TH	TWK	PR	OR	Total
					Hours	Marks							
03	--	--	01	04	03	70	20	10	70	25	-	-	125

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 ad 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)	
2	Prof. Mrs. Anita A. Kulkarni, Head of Department.	
3	Prof. Mrs. Kirti P. Bhave, Lecturer (Selection Grade)	
	NAME OF EXPERT (External)	
4	Prof. Mrs Aanchal Lalla, Lecturer , K.J.S Polytechnic , Mumbai	

1. COURSE DETAILS

Programme: Electrical Engineering/Industrial Electronics/Digital Electronics	Semester: I
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 inti 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 RESOURSES

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	Jevapoovan 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=yruPUj 61bw
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 Si93Y36tU[1]1nY

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.COURSEDETAILS

Programme:Electrical Engineering	**Semester: I**
Course: DC Circuit Fundamentals	**Group: C***
Course Code:DCF 190301	**Duration:16 Weeks**

2. TEACHINGAND EXAMINATIONSCHEME

Scheme of Instructions and Periods per Week					ExaminationSchemeandMaximumMarks							
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 OBJECTIVE:

This Course deals with the basic concepts, rules and laws of electric and magnetic circuits and practical's thereof. The basic concepts of electrical engineering in this course will be very useful for understanding of other higher level courses in further study.

4. SKILL COMPETENCY :

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

1. Use basic principles of electrical engineering in different applications.

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

CO No.	COURSE OUTCOME	Bloom's Level
1	Determine various parameters used in electric circuit.	R, U, A
2	Use of basic laws and rules of electrical engineering.	R, U, A
3	Suggest the application of various capacitors in electric circuits.	R, U, A
4	Determine basic parameters of electromagnetic circuits.	R, U, A
5	Suggest the type and rating of storage battery according to given application.	R, U, A

6. COURSE CONTENTS

Sr. No.	Topic/Sub-Topics	Hours	Marks	COs
1	**Basic Electrical Parameters** 1.1 Concepts of free electrons, electrical potential, Potential difference, Electromotive force (EMF), electric current, 1.2 Direct Current (DC), Alternating current (AC), Voltage source and current source: Ideal and Practical 1.3 Electric work, Power and Energy (simple numericals)	04	06	CO1
2	**ResistanceParameter** 2.1 Ohm's Law, unit of resistance and resistivity, conductance and conductivity. 2.2 Dependence of resistance on temperature, temperature co-efficient of resistance, related numerical problems. 2.3 Series and parallel connections of resistance, expression for total resistance 2.4 Kirchhoff's Laws, division of voltage in series and division of current in parallel with formulae's. 2.5 Types of resistors and their applications (simple Numericals)	10	14	CO2
3	**Magnetic circuits** 3.1 Magnets, magnetic lines of force, properties of lines of Force, electromagnetism. 3.2 Flux around a current carrying conductor, Cork's screw rule, right hand rule, Flux density 3.3 Magneto-motive force (MMF), Ampere turns, Reluctance, Permeance, reluctivity 3.4 Fleming's left and right hand rule, Solenoid and its field. 3.5 Behavior of ferromagnetic materials, B-H curve. 3.6 Hysteresis loop Hysteresis loss and its, empirical formula. 3.7 Eddy current loss, its empirical formulae. 3.8 Comparison of electric circuit with a magnetic circuit. 3.9 Calculation of ampere turn for series, parallel and series parallel type magnetic circuit. (Only Simple Numerical)	10	14	CO4
4	**Inductance parameter** 4.1 Development of induced emf and current, Faraday's law of electromagnetic induction 4.2 Static and dynamic emf, Lenz's law, Fleming's right hand rule 4.3 Self-inductance, coefficient of self-inductance (L), Mutual inductance (M), coefficient of mutual inductance 4.4 Self-induced emf and mutually induced emf, Coefficient of coupling. 4.5 Inductance in series and Parallel. 4.6 Energy stored in inductance 4.7 Types of inductor and their applications (Simple Numerical)	10	14	CO4

5	**Capacitance parameter** 5.1 Charge, its field, flux density, permittivity of medium, parallel plate capacitor and its capacitance, Breakdown voltage 5.2 Construction and action of capacitor 5.3 Dielectric strength. Expression for capacitance of a composite dielectric capacitor. 5.4 Capacitance in series and parallel. 5.5 Energy stored in Capacitor 5.6 Types of capacitor and application.	**10**	**14**	**CO3**
6	**Storage Batteries** 6.1 Construction 6.2 Principle of working and taking care of lead acid accumulators, nickel alkaline cells solar cells. 6.3 Ampere-hour rating, Ampere-hour efficiency & Watt-hour efficiency	**04**	**07**	**CO5**
	Total	**48**	**70**	

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

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approx.Hrs required	COs
1	Verification of ohm's law.	2	CO2
2	Determination of the equivalent resistance of series connection	2	CO2
3	Determination of the equivalent resistance of parallel connection	2	CO2
4	Verification of Kirchhoff's current law.	2	CO2
5	Verification of Kirchhoff's Voltage law.	2	CO2
6	Measurement of medium resistance and calculation of temperature coefficient of resistance.	2	CO2
7	Verification of charging and discharging of capacitor	2	CO4
8	Study of Hysteresis loop.	2	CO4
9	Verification of Faraday's law of Electromagnetic induction	2	CO4
10	Study of storage batteries	2	CO5
11	Assignment of chapter 1& 2	2	CO 1,2
12	Assignment of chapter 3 & 4	2	CO 4
13	Assignment of chapter 5	2	CO 3
14	Assignment of chapter 6	2	CO 5

8. IMPLEMENTATION STRATEGY (PLANNING)

1.Teaching Plan.
2. Assignments.
3. Guest/Expert lectures.
4. Continuous assessment.
5. Slides.
6. Any other.

9.0 LEARNING RESOURSES

Sr.	Title of Book	Author	Publication
1.	Electrical Technology Volume – I	B.L.Theraja	S.Chand and Co. New Delhi.
2.	Electrical Technology	Edward Hughes	Pearson Education. New Delhi.
3	Basic Electrical Engineering	V.N.Mittal	Tata McGraw-Hill. New Delhi.
4	Fundamentals of Electrical Engineering	Saxena S.B.	Cambridge University Press, New Delhi.

10. WEB REFERENCES

1)www.nptel.ac.in
2) www.electricaltechnology.org
3) www.electrical4u.com

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	Topics	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Basic Electrical Parameters	3	2	2	07
2	Resistance Parameter	4	6	4	14
3	Magnetic circuits	4	6	4	14
4	Inductance parameter	4	6	4	14
5	Capacitance parameter	4	6	4	14
6	Storage Batteries	3	2	2	07
TOTAL		**22**	**28**	**20**	**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.Dinesh G. Rajmandai	
2	Internal	Miss.Urvi H. Sawant	
3	Internal	N D Adate	
4	External	Pragati Samudre	
		Organisation : V.J.T.I	

1. COURSE DETAILS

Programme: CE/ME/EE/IE/PL/CH/DE	Semester: II
Course: Engineering Mathematics	Group: B*
Course Code: EMT190009	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	-	-	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 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 • 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 Movires 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 RESOURES

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.archieves.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	**Semester: I/II**
Course: Applied Chemistry	**Group: B***
Course Code:ACH190002	**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

a. Basic principles of Chemistry

b. 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_2O, Cl_2, NH_3, C_2H_4, N_2, C_2H_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: Volumetric Analysis 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 $FeSO_4.7H_2O$	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	Qualitative Analysis of **Two Solutions** 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 RESOURSES

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	
2	Internal	K.P.Bhave	
3	Internal	R.D.Shimpi	
4	External	Dr. S. Usri Organization: Mucchala Polytechnic Thane.	

1. COURSE DETAILS: Development of Life skills

Program: CE / ME /EE/ IE/PE/CH/DE	**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	Tutorial	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 DEVLOPMENT 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 9.3Types 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 RESOURSES

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: Diploma in Electrical Engineering	Semester: II
Course: Basic Electronics	Group: B*
Course Code: BEX 190302	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							
4	2	--	--	6	03	70	20	10	70	25	50	--	175

3. COURSE OBJECTIVE:

In present era the field of electronics plays an important role in almost every sphere of our life. It has penetrated in every field of engineering.

It is therefore necessary for an engineer to study the electronic components, their characteristics and applications.

4. SKILL COMPETENCY

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

- Maintain electronic circuits comprising of discrete electronic components
- Interpret datasheet of 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	Draw and identify symbol, construction and characteristics of semiconductor devices.	R,U
2	Describe operation of electronic circuits employing semiconductor devices.	R,U
3	Select and use appropriate rectifier, filter and amplifier for required application.	R,A
4	Recognize the applications of electronics devices in power supply and oscillator.	U,A
5	Test, troubleshoot and choose electronic circuits by selecting proper tools.	U,A

6. COURSE CONTENTS

Sr.No.	TOPIC/Sub-Topics	Hours	Marks	COs
1	**Semiconductor Physics** 1.1 Introduction-Conductor, Semi-Conductor and insulator 1.2 Intrinsic and Extrinsic Semiconductor, doping, charge carriers 1.3 Semiconductor diode(P-N Junction)-working under unbiased ,forward bias and reverse biased condition & V-I Characteristics 1.4 Half Wave Rectifier (HWR) and Full Wave rectifier (FWR), their working with waveforms and their expression of average and rms voltage and current, ripple factor, efficiency (No derivation expected). 1.5 Filter: Types-C,L, CLC (π). Their advantages and disadvantages. 1.6 Zener diode : Construction, symbol, working, characteristics and its application 1.7 Photo diode-Construction, working principle, characteristics and application 1.8 LED-Construction, working principle, characteristics and application	14	**16**	CO1 CO2 OC3 CO5
2	**Bipolar Junction Transistor** 2.1 Construction, symbol and working principle of NPN and PNP transistor 2.2 Characteristics of CB,CE and CC Configuration 2.3 Transistor parameter-Input resistance, Output resistance α & β and relation between them.(basic Numerical) 2.4 Concept of transistor as a Switch 2.5 Transistor as an Amplifier 2.6 Transistor as an Inverter	10	**12**	CO 1 CO 2 CO 3 CO 5
3	**Transisor Biasing** 3.1 Need of biasing circuits 3.2 different types of biasing: • Fixed bias • Fixed bias with emitter resistor, • Collector to base bias, • Voltage divider biasing	08	**07**	CO1 CO 2 CO 3
4	**Field Effect Transistor** 4.1 Construction and working of P and N channel type (JFET) 4.2 Types of JFET and MOSFET, symbol and characteristics 4.3 Application of FET **4.4** Comparison of BJT, FET & MOSFET.	**12**	**16**	CO 1 CO 2 CO 3

5	**Small Signal Amplifier** 5.1 Concept of Amplifier 5.2 Voltage gain (No derivation) 5.3 Single stage CE amplifier 5.4 Frequency response of Single Stage CE amplifier 5.5 Multistage Amplifier (Cascaded Amplifier)- • Need, gain of Amplifier • Types of Amplifier Coupling-Direct, RC and transformer coupling	**12**	**10**	CO 1 CO 2 CO 5
6	**Regulated Power Supply** 6.1 Need of Regulator 6.2 Concept of Load and line regulation. 6.3 Zenner Diode as a voltage regulator 6.4 Regulator IC 78XX,79XX (Numerical can be asked)	**08**	**09**	CO 2 CO 4 CO 5
	TOTAL	**64**	**70**	

7. LIST OF PRACTICALS

Term Work consists of Journal containing minimum no of 10 experiments with approx.no of hours required and corresponding CO attained should be specified here.

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approx. Hrs required	COs
1	P-n junction diode characteristics	2	CO 1,5
2	Zenner Diode characteristics	2	CO 1,5
3	Zenner diode as a voltage regulator	2	CO 1,4,5
4	Half wave rectifier	2	CO 1,4,5
5	Full Wave Rectifier	2	CO 1,4,5
6	Study of filter	2	CO 3,5
7	Characteristics of BJT in CE configuration	2	CO 1,2,5
8	CE Amplifier	2	CO 2,5
9	FET Characteristics	2	CO 2.5
10	Frequency response of CE Amplifier	2	CO 2,3,5
11	Two Stage RC Coupled Amplifier	2	CO 3,5
12	RC Phase Shift Oscillator	2	CO 3.5
12	78XX regulator	2	CO 4,5
13	Simulation	2	CO 2,5
14	Simulation	2	CO 2,5

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Minimum no of practical/assignments.
3. Guest/Expert lectures & Demonstrations/Simulations
4. Slides & Quiz
5. Any other method adopted

9. LEARNING RESOURSES

Sr. No.	Title Of Book	Author	Publication
1.	Electronics Devices and Circuits	Robert Boyalestead	PHI New Delhi
2.	Basic Electronics and Linear Circuits	N.N.Bhargava,D.C.Kulshreshtha and S.C.Gupta-TTTI Chandigarh	Tata McGraw Hill
3.	Basic Electronics	Grob Bernard	Tata McGraw Hill
4	Principles of Electronics	V.K.Mehta	S.Chand

10. WEB REFERENCES

1. http://electronicsforu.com/
2. http://www.electronicshub.org/
3. http://electronicdesign.com/
4. https://www.allaboutcircuits.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	Semiconductor Physics	6	5	5	16
2	Bipolar Junction Transistor	6	6	-	12
3	Transistor Biasing	3	-	4	07
4	Field Effect Transistor	6	6	4	16
5	Small Signal Amplifier	4	6	-	10
6	Regulated Power Supply	-	4	5	09
TOTAL		**25**	**27**	**18**	**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.S.S.Rokade	
2	Internal	Mr.P.S.Dhuri	
3	Internal	Mr.N D Adate	
4	External	VIVEK DHADAM	
		Organisation : SADGURU ELECTRICALS	

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056.

1. COURSE DETAILS

Programme: Electrical Engineering	Semester: II
Course: Electrical Materials & Appliances	Group: C*
Course Code: EMA 190303	Duration: 16 Weeks

2. TEACHINGAND 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	-	25	150

3. COURSE OBJECTIVE:

The objective of the subject is to provide information and knowledge of various material used in Electrical Engineering and commonly used domestic appliances. A diploma holder in Electrical Engineering is involved in manufacturing, installation, maintenance and repairing of electrical equipment and systems. In addition, he/she may be required to procure, inspect and test electrical engineering materials. Therefore, knowledge of various types of materials is needed in order to execute these functions. He/she may also have to decide for an alternative when a particular material is either not readily available in the market or its cost becomes prohibitive.

4. SKILL COMPETENCY

- Identify the property of materials for best selection of Electrical products used in Electrical Engineering.
- Conduct open circuit, short circuit and earth test on domestic appliances.

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

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	State the physical, Thermal, mechanical, magnetic, Chemical and electrical properties of materials.	Remember
2	Classify various Electrical Engineering materials and domestic appliances	Understand
3	Select proper material for various Electrical Engineering applications ensuring safety and stability of machines	Application
4	Describe construction , working principle, technical specifications and applications of Domestic appliances	Understand
5	Assemble, Dissemble and Trouble shoot the common faults in Domestic Appliances	Application

6. COURSE CONTENTS

Sr. No.	TOPIC/Sub-Topics	Hours	Marks	COs
1	**Conducting Materials** 1.1Classification based on energy band with their applications. 1.2 Properties of conducting materials. 1.3 Classification of conducting materials. 1.4 Materials for lamp filaments, arc lamps, heating elements, contacts, switches, with their properties. 1.5 Properties and applications of different metals and their alloys (Cu, Al, steel, Graphite, bronze, mangenin, nichrome, carbon, tungsten, brass).	08	14	CO 1 CO 2 CO 3 CO 3
2	**Magnetic Materials** 2.1Classification of magnetic materials. 2.2Magnetic Dipole moment. 2.3Magnetization, Properties of magnetic materials. 2.4 Ferromagnetism, Magnetostriction, 2.5Properties of soft and hard magnetic materials such as steel alloys, silicon, nickel, chrome steel, cobalt steel, alnico and ferrites, hot rolled and cold rolled grain oriented steels. 2.6 Permanent magnetic materials. 2.7 Losses in magnetic materials and its applications.	08	13	CO 2 CO 3 CO 3 CO 3 CO 2
3	**Dielectric Materials** 3.1 Different methods of polarizations, 3.2 polar and non-polar dielectric, loss angle. 3.3 Capacitors, ceramic capacitors, paper, mica, SF6 gas. 3.4 Applications	04	08	CO 2 CO 3
4	**Insulating Materials** 4.1 General properties of insulating materials, 4.2 Classifications. 4.3 Inorganic insulating materials, such as mica, asbestos, glass, porcelain, marble slate, white clay. 4.4 Organic insulating materials such as rubber, fibraper, wood, varnish. 4.5 Applications of all Insulating materials	08	12	CO 1 CO 2 CO 3 CO 3
5	**Polymers** 5.1 Definition: Special characteristics of plastics. 5.2 Classification of plastic: Thermoplastics ,Thermosets 5.3 Properties & Applications of 5.4Thermoplastics : Poly methyl methacrylate (PMMA) Poly Styrine (PS), Nylon, PVC, Polyethylene (PE) 5.5 Thermosets: Urea formaldehyde (UF), Melamine Formaldehyde (MF) , Phenol Formaldehyde (PF), Epoxy, Unsaturated Polyester .	10	10	CO 1 CO 2 CO 2
6	**Domestic Appliances** Construction, working principle of.. 6.1Heating Appliances : 1) Automatic electric iron, 2) Resistance oven, 3) Electric kettle	10	13	CO 4,5

	4) Water heater, 6.2 Motorised Appliances : 1) Grinder, 2) Food processor, 3) Table and ceiling fan, 4) Vacuum cleaner, 5) Drilling machine, 6) Washing machine, 7) Hair dryer, 8) Domestic water pump etc. 6.3 Trouble shooting of domestic appliances:			+
	TOTAL	**48**	**70**	

7. LIST OF PRACTICALS

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

Sr. No.	Title of Experiment	Approx.Hrs required	COs
1	Demonstration and testing of Automatic electric iron,	2	CO 2,4,5
2	Demonstration and testing of Resistance oven,	2	CO 2,4,5
3	Demonstration and testing of Electric kettle	2	CO 2,4,5
4	Demonstration and testing of Water heater,	2	CO 2,4,5
5	Demonstration and testing of Grinder,	2	CO 2,4,5
6	Demonstration and testing of Food processor,	2	CO 2,4,5
7	Demonstration and testing of Table and ceiling fan,	2	CO 2,4,5
8	Demonstration and testing of Vacuum cleaner,	2	CO 2,4,5
9	Demonstration and testing of Drilling machine,	2	CO 2,4,5
10	Demonstration and testing of Washing machine,	2	CO 2,4,5
11	Demonstration and testing of Hair dryer,	2	CO 2,4,5
12	Demonstration and testing of Domestic water pump etc.	2	CO 2,4,5
13	Collection of following materials and presentations on the properties and applications of Electrical engineering Materials. a) Conduction Materials b) Magnetic Materials c) Insulating Materials d) Semi-Conducting Materials e) Dielectric Materials f) Polymers	- 2 2 2 2 2 2	 CO 1,2, 3 CO 1,2, 3 CO 1,2, 3 CO 1,2, 3 CO 1,2, 3 CO 1,2, 3

8. IMPLEMENTATION STRATEGY (PLANNING)

Dismantling & conducting various test like series test, short circuit test, open circuit test and earth test and reassembling the same.

1. Teaching Plan
2. Slides
3. Guest/Expert lectures
4. Group Discussion

5. Minimum no of practicals
6. Self-Learning Online Resources
7. Any other method adopted

9. LEARNING RESOURSES

Sr. No.	Title of Book	Author	Publication
1.	Electrical Engineering Materials	Dr. C.S. Indulkar Dr. S Thiruvengadam	S. Chand Publications 4th edition
2	Electrical & Electronics Engineering Materials	P L Kapoor	Khanna Publications
3	Electrical & Electronics Engineering Materials	G K Banarjee	Prentice Hall of India, New Delhi
4.	Electrical Engineering Materials	A.J. Dekker	Prentice Hall of India, New Delhi
5.	Electrical Material	Dr.H.P.Inamdar	Vrinda Prblication
6.	Study of Electrical Appliances and Devices	K. B. Bhatia	Khanna Publishers; 1988
7.	Electrical Engineering Materials	N.I.T.T.T.R. Chennai	N.I.T.T.T.R. Chennai

10. WEB REFERENCES

- http://nptel.ac.in/courses/122102008/
- http://www.nsci.org.in/
- http://www.esfi.org/
- http://www.osha.gov/Publications/electrical_safety
- http://www.nfpa.org/safety
- www.electrical4u.com
- www.electricalnotesandarticles.com

11. SUGGESTED SPECIFICATION TABLE:

Sr.No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Conducting Materials	3	8	3	14
2	Magnetic Materials	5	5	3	13
3	Dielectric Materials	-	5	3	08
4	Insulating Materials	6	3	3	12
5	Polymers	-	5	5	10
6	Domestic Appliances	5	5	3	13
TOTAL		**19**	**31**	**20**	**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	Shri N D Adate	
2	Internal	Mrs. Ajayshree Kinhekar	
3	Internal	Shri S G Borse	
4	External	Sheeja Nair	
		Organisation: D.J.S.C.O.E, Mumbai	

1.COURSE DETAILS:

Programme: Electrical Engineering	Semester: II
Course: AC Circuits Fundamentals	Group: C*
Course Code:ACF 190304	Duration:16 Weeks

2. TEACHINGAND EXAMINATIONSCHEME

Scheme of Instructions and Periods per Week					ExaminationSchemeandMaximumMarks							
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 OBJECTIVE:

This Course deals withthe single phase AC circuits, three phases AC circuits and practical's thereof. The basic concepts of electrical engineering in this course will be very useful for understanding of other higher level courses in further study.

4. SKILL COMPETENCY

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

1. Maintain electrical systems applying single phase and three phase AC circuit fundamentals.

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

CO No.	COURSE OUTCOME	Bloom's Level
1	Determine basic parameters and perform basic operations of sinusoidal vector quantities.	R, U, A
2	Calculate basic parameters of single phase series and parallel circuits.	R, U, A
3	Calculate three phase current, voltage, power and symmetrical components of three phase balanced and unbalanced circuits.	R, U, A
4	State causes and effects of harmonics in AC circuits.	R, U
5	Verify basic laws and principles and measure basic Electrical parameters	U, A

6. COURSE CONTENTS:

Sr. No.	Topic/Sub-Topics	Hours	Marks	COs
1	**Sine wave** 1.1 Generation of alternating voltage 1.2 Alternating quantities and different waveforms 1.3 Sinusoidal wave, production of sine wave from a rotating phasor 1.4 Instantaneous, average, maximum (peak) and R.M.S. values. Amplitude, cycle, frequency & period of a wave. 1.5 Concept of leading and lagging phasors. 1.6 Representation of phasor in rectangular, polar and exponential forms and conversion of one form into another. 1.7 Addition, subtraction, multiplication, division, raising of a phasor to some power using the different phasor representation. Conjugate phasor. (Simple Numericals on above)	08	11	CO1
2	**Single phase series circuit** 2.1 Behavior of pure R, L, C elements to ac source. 2.2 Waveforms, phasor relations of voltage and current in each element. 2.3 Series combination of R-L, R-C and R-L-C circuits. Impedance, reactance, representation of impedance by a triangle, power factor, active power, reactive power, apparent power, power triangle and vector diagram 2.4 Resonance, Bandwidth, Quality factor (Simple Numericals on above)	10	12	CO2 CO 5
3	**Single phase ParallelCircuits** 3.1 Parallel combination of R-L, R-C and R-L-C circuits. Impedance, reactance, representation of impedance by a triangle, power factor, active power, reactive power, apparent power, power triangle and vector diagram 3.2 Resonance, Bandwidth, Quality factor 3.3 Comparison between series and parallel circuit. 3.4 Resonance by variation of frequency, inductance and Capacitance (Simple Numericals on above)	08	12	CO2 CO 5
4	**Three Phase Circuits** 4.1 Generation of Three phase voltage, phase sequence 4.2 Relation between line and phase voltage and current for star and delta connection. 4.3 Balance and unbalanced load, Neutral shift 4.4 Expression for total powers (true, apparent, reactive) in terms of line voltage and line current for star as well as delta connection.(Simplenumericals)	08	14	CO3 CO 5

5	**Symmetrical components** 5.1 Fortescue's theorem 5.2 Definition of operator "a". 5.3 Calculation of Symmetrical components from a set of three unbalanced voltage or current. 5.4 Calculation of unbalanced voltage & current from given symmetrical components. 5.5 Graphical method for determination of Symmetrical component. (Simple Numericals on above)	08	14	CO3
6	**Harmonics** 6.1 Introduction to harmonics, Odd & even harmonics 6.2 Types of harmonics and its causes and effects 6.3 Harmonics in single phase AC circuits (Simple Numericals on above)	06	07	CO4
	Total	48	70	

7. LIST OF PRACTICALS/ASSIGNMENTS:

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

Sr. No.	Title of Experiment/Assignment	Approx. Hrs required	COs
1	Three voltmeter method to determine inductance of the coil.	2	CO2,5
2	Three ammeter method to determine inductance of the coil.	2	CO2, 5
3	Three voltmeter method to determine capacitance.	2	CO2, 5
4	Three ammeter method to determine capacitance.	2	CO2, 5
5	RLC in series resonance.	2	CO2, 5
6	RLC in parallel.	2	CO2, 5
7	Study of behavior of Pure resistor,inductor and capacitor to A.C Source.	2	CO2
8	Three Phase Balanced Star Connection	2	CO3, 5
9	Three Phase Balanced Delta Connection	2	CO3, 5
10	Three Phase Unbalanced Star Connection	2	CO3, 5
11	Study of harmonics in electrical circuits	2	CO4
12	Assignment on Chapter 1 & 2	2	CO1, CO 2 CO 5
13	Assignment on Chapter 3 & 4	2	CO2 CO 3 CO 5
14	Assignment on Chapter 5 & 6	2	CO 3 CO 4

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan.
2. Assignments.
3. Guest/Expert lectures.
4. Slides and Videos
5. Any other method adopted.

9. LEARNING RESOURSES

Sr. No.	Title of Book	Author	Publication
1.	Electrical TechnologyVolume – I	B.L.Theraja	S.Chand and Co. New Delhi.
2.	Electrical Technology	Edward Hughes	Pearson Education. New Delhi.
3	Basic Electrical Engineering	V.N.Mittal	Tata McGraw-Hill. New Delhi.
4	Fundamentals of Electrical Engineering	Saxena S.B.	Cambridge University Press, New Delhi.

10. WEB REFERENCES

1)www.nptel.ac.in
2) www.electricaltechnology.org
3) www.electrical4u.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	Sine wave	5	4	2	11
2	Single phase series circuit	4	4	4	12
3	Single phase Parallel Circuits	4	4	4	12
4	Three Phase Circuits	3	6	5	14
5	Symmetrical components	3	6	5	14
6	Harmonics	3	2	2	07
TOTAL		**22**	**26**	**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. Dinesh G. Rajmandai	
2	Internal	Miss. Urvi H. Sawant	
3	Internal	Mr.N D Adate	
4	External	Sheeja Nair	
		Organisation D.J.S.C.O.E. Mumbai	

SHRI BHAGUBHAI M. FAFLAL POLYTECHNIC MUMBAI 400056.

1. COURSE DETAILS

Programme: Diploma in Electrical Engineering	Semester: II
Course: Workshop Practice (EE)	Group:C*
Course Code: WPE 190305	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	--	--	04	--	--	--	--	--	50	--		50

3. COURSE OBJECTIVE:

This course in introduced at the first level of Electrical Engineering as the student at the entry should get acquainted with different types of IS, IEC standards and all kinds of commonly used electrical instruments, wires. Also the aim of the course is to develop the various basic skills required for industry to identify various manufacturing processes and to use various workshop tools and equipment by following safety practices. The objective of electronic workshop is to expose electrical students to various electronic components diagrams soldering de- soldering techniques, tools & assemblies

4. SKILL COMPETENCY:

- Know various types of wires, switches as per IS and IEC Standards.
- Use Various types of meters
- **Make the** connections for series and parallel circuits used in electrical wirings

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

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Identify various types of wires, switches, tools, safety equipment, symbols as per IS and IEC Standards	Understanding
CO 2	Describe construction and working of various electrical equipment, tools, accessories, instruments.	Remembering
CO 3	Prepare the connections for different types of wirings	Applying
CO 4	List and understand the working of common electronic components.	Remembering and Understanding
CO 5	Assemble electronic components and prepare useful electronic kits	Applying

6. COURSE CONTENTS

Sr.No.	TOPIC/Sub-Topics	Hours	Marks	COs
1	**Electrical Components and Accessories** 1.1 Different Switches, sockets, circuit breakers, fuses, lamp holders, adaptors, terminal post, Plug, Ceiling Rose, Capacitors, Resistors, Inductors and Choke, knobs , Transformer, wire, Starters, Motors etc. 1.2 Insulation tapes, adhesives, sleeves	-	-	CO1 CO2
2	**Electrical Tools and Instruments** 2.1 Electrical cutters and players, Portable drilling machine, Tester, Continuity tester, Test Lamp, Safety shoes and hand gloves, Extension box, Different types Screw Drivers, Stripper, Pullers, Electrician knife, spanners, crimping tool 2.2 Voltmeter, Ammeter, Wattmeter Multimeter, Megger	-	-	CO 1 CO 2
3	**Electrical Symbols and Circuits** 3.1 Electrical Symbols as per IS and IEC 3.2 Electrical Supply: Single Phase, Three Phase, Earthing 3.3 Wiring Circuits & their connections: Different electric wiring circuits: Schematic diagrams, wiring diagrams, single line diagrams	-	-	CO1 CO3
4	**Electrical Shock Hazards and Safety Precautions** 4.1 Electric Fire 4.2. Fire Extinguishers 4.3 Electric shock and its effects on Human Body 4.4 Electric Shock Treatment by CPR method 4.4 Actions to be taken if person gets electric shock 4.5 Electrical Safety and Precautions	-	-	CO1 CO3 CO4
5	**Electronic Components &Diagrams** 5.1 Sketching and understanding specifications of Electronics Components: 5.2 Resistors, Capacitors, Inductors, Diodes, Transistors, PCBs, Electronic Switches, Transformers, etc. 5.3 Sketching and understanding of : 5.4 Block diagrams, Schematic diagrams, Chassis layout, Front panel layout, Wiring diagram, PCB layout, PCB artwork	-	-	CO 1 CO 4

6	**Electronic workshop tools & Assembly** 7.1 Study and use of : Rule, Dividers, Calipers, Squares, Hammer, Punch, Hacksaw, Files, Scrubber, Pliers, Cutter, Screw drivers, Allen key, Micrometer, Bench vise, C-clamp, Drill bits, Tap, Strippers, Drilling machine, Grinder 7.2 Study of PCB Fabrication, Soldering of Electronics components or parts on PCB, Chassis Fabrication and Chassis Wring etc.Soldering Techniques 6.1 Soldering, De-soldering and Tinning of electronic / electrical components using Soldering iron and De-soldering pump	-	-	CO5
	Total	-		

7. LIST OF PRACTICALS:

Term Work consists of Journal containing minimum no 8 of Experiments and 3-4 Assignments from the following.

Sr. No.	Title of Experiment	Approx.Hrs required	COs
1	Study of Electrical Symbols	04	CO 1
2	Study of various tools used in electrical and electronic laboratories	08	CO 2
3	Study of various types of meters used in electrical and electronics labs	08	CO 3
4	Study of Electrical accessories used in in electrical wirings	04	CO 3
5	Study of Electrical safety precaution and hazards	08	CO 4
6	Types of Wires-TRC/CTS/PVC etc.	04	CO 3
7	Connections of Wiring Circuits- Series/Parallel/Staircase/Godown wiring.	08	CO 5
8	Different types of PCB layouts	08	CO 5
9	Mini Project based on PCB using soldering and disordering	12	CO 5
10	Homework Assignment on chapter -1& 2	-	CO1 CO2
11	Homework Assignment on chapter -3	-	CO1 CO3
12	Homework Assignment on chapter -4	-	CO1 CO 3 CO 4
13	Homework Assignment on chapter -5	-	CO 1 CO 4
14	Homework Assignment on chapter -6		CO 5

8. IMPLEMENTATION STRATEGY (PLANNING)

1. As per the Plan
2. Slides
3. Assignments
4. Demonstrations and Practicals
5. Any other method adopted

9. LEARNING RESOURSES

Sr. No.	Title Of Book	Author	Publication
1.	Electrical Engineering Materials	C.S. Indulkar	S. Chand & Company.
3.	Electrical Appliances & Devices	K B Bhatia	Khanna Publications
4.	Electronics components and Workshop	A.G.Patil	Learning Material
5.	Electronic Materials and Components	Madhuri Joshi	A.H.Wheeler & Co.Ltd Allahabad
6.	Electronic Material and Component Devices and Technology	Prof. S.D. Raut	Technical Publications, Pune

10. WEB REFERENCES

1. www.electricaltechnology.org.com
2. www.electrialnotesand articles.com
3. www.engineeringmaterials.com
4. https://www.wilhelmsen.com/globalassets/marine-products/welding/documents/wilhelmsen-ships-service---unitor-welding-handbook.pdf
5. http://infohouse.p2ric.org/ref/36/35594.pdf
6. https://www.weldingtechnology.org
7. www.sciencebuddies.com

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.

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	NAME		SIGNATURE
1	Internal	Namdeo Adate	
2	Internal	Ajayshree Kinhekar	
3	Internal	Sagar Borse	
4	External	VIVEK DHADAM	
		Organisation : SADGURU ELECTRICALS