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

Department of **CHEMICAL ENGINEERING**
Three Years Full Time Diploma with Inplant Training
In
CHEMICAL ENGINEERING
CURRICULUM
Semester Pattern
(Effective from June' 2019)

Head of the Chem. Engg. Deptt.
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC.
VILE PARLE (WEST), BOMBAY-400 056.

Approved Copy

Curriculum Co-Ordinator / COE

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

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
MUMBAI 400 056.

Shri Vile-Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic, Mumbai

(AN ACADEMICALLY AUTONOMOUS GRANT-IN AID INSTITUTE)

CURRICULUM 2019

DIPLOMA PROGRAMME
IN
CHEMICAL ENGINEERING

INDEX

17	II SEMESTER COURSES		
	Course Code	**Course Name**	
17.1	EMT190009	Engineering Mathematics	
17.2	DLS190004	Development of life Skills	
17.3	APH190010	Applied Physics	
17.4	OPC190601	Organic and Physical Chemistry	
17.5	BEE190016	Basics of Electrical & Electronics	
17.6	FCE190602	Fundamental of Chemical Engineering	
17.7	STM190012	Stress Management	
18	**III SEMESTER COURSES**		
	Course Code	**Course Name**	
18.1	AMT190013	Applied Mathematics	
18.2	MOP190603	Mechanical Operation	
18.3	TIC190604	Technology of Inorganic & Organic Chemicals	
18.4	FFO190605	Fluid Flow Operation	
18.5	HTO190606	Heat Transfer Operation	
18.6	TOP190503	Technology Of Plastics	
19	**IV SEMESTER COURSES**		
	Course Code	**Course Name**	
19.1	CRE190608	#Chemical Reaction Engineering	
19.2	POS190609	Principles of Stoichiometry	
19.3	PED190610	Process Equipment Drawing	
19.4	PUT190611	#Plant Utilities	
19.5	IMG190014	#Industrial Management	
19.6	PSL1900612	A]#Plant Safety & Loss Prevention	
19.7	PCW190613	B]#Pollution Control & Waste Disposal	
19.8	CET190614	Chemical Engineering Thermodynamics	
19.9	IES190615	Introduction to Energy System	

PREFACE

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC started three years 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 years 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, our 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, which is Choice and Credit Based System(CCBS). This is a diploma program of three-year duration with inplant training in fifth semester.

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 centre 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.

The emphasis is this Programme is on unit operations, Process technology of important commercial chemicals, Process Instrumentation and Control, PFD and P&ID, along with supervisory skills.

The Programme also covers different areas such as Plant Safety, Utilities, Pollution Control and Waste Disposal Reaction engineering. The students undergoing inplant training during the course

get well conversant with plant operations, fabrication, Maintenance of Chemical Plant and different software are used in drafting (Autocad And CADMATICS)

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 System (CCBS)" for the students opting admission after passing 12th, ITI, MCVC. At higher entry level, 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 guide line 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 fulfilment 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

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC ★ MUMBAI 400 056.

Shri Vile-Parle Kelavani Mandal's
Shri Bhagubhai Mafatlal Polytechnic, Mumbai

VISION

SBM Polytechnic aspires to be the lead institute in providing need based technical education
SBM

MISSION

1 To provide state of art infrastructure and latest equipment for providing a stimulating learning environment.

2 To prepare students to meet the dynamic needs of the industry by periodic reviewing and upgradation of curriculum through an interactive process with industry.

3 To inculcate a spirit of excellence in terms of academic performance, research and innovation in faculty by providing appropriate support and incentive systems.

4 To promote and support Co-Curricular, extra-curricular activities and industry interaction to make students socially sensitive and employable.

CHEMICAL DEPARTMENT

VISION

Envision good human beings empowered with need based Chemical Engineering education.

MISSION

M1. To develop competent engineers with excellence in technical and problem solving skills.

M2. To prepare employable personnel and entrepreneurs through industry-institute interaction.

M3. To enhance competency through self-evaluation and continuous improvement.

M4. To inculcate sense of discipline, responsibility towards society and promote lifelong learning.

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400 056.

JOB PROFILE OF CHEMICAL DIPLOMA PASSOUTS :

On completion of Diploma students will be able to work as:

- Foreman
- Supervisor
- Plant Operator
- Maintenance Technician
- Middle Management (Consultancy Firms)

DIPLOMA PROGRAMME IN CHEMICAL ENGINEERING

RATIONALE :

The Diploma course in chemical engineering deals with various aspects of chemical industry, such as, Unit operations, Process Technology of Important Commercial Chemicals, Process Control and Instrumentation. The course covers, important aspects such as, Mass Transfer, Heat Transfer, Fluid flow Pollution Control and Waste Disposal, Stoichiometry and Safety in Plant Operation, Computer Aided Drafting using Autocad and CADMATICS (3d piping Drawing)

The students undergoing this course get well conversant with the plant operation and maintenance of modern chemical plant. They can work in industry as foremen, supervisors at the shop floor level. They can also work for fabrication, erection and commissioning of plants as well as in consultancies as process and piping engineers.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1 - Enhance knowledge of basic principles of science and Chemical Engineering.

PEO2 - To solve Chemical Engineering problems, considering safety, environmental and social aspects.

PEO3 - Develop entrepreneurial qualities, soft skills and promote lifelong learning.

PROGRAMME OUTCOMES (POs)

On Successful Completion of Diploma Programme in Chemical 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 Chemical Engineering, the student will be able ,

PSO 1: To Apply Core concepts of unit process and unit operation in process industries to operate the equipment and using materials effectively.

PSO 2: To lay drafting of PFD, ULD, P&ID, for chemical process plant using AutoCAD.

MAPPING OF MISSION AND PROGRAMME EDUCATIONAL OBJECTIVES

Sr. No.	Mission	Components of Mission Statement	PEO/s
1	M1	To develop competent engineers with excellence in technical and problem solving skills.	I,II,III
2	M2	To prepare employable personnel and entrepreneurs through industry-institute interaction.	II, III
3	M3	To enhance competency through self-evaluation and continuous improvement.	I,II,III
4	M4	To inculcate sense of discipline, responsibility towards society and promote lifelong learning	I, II,III

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES AND PROGRAMME OUTCOMES

Sr. No.	Programme Educational Objectives (PEOs)	Programme Outcomes (POs)
1	Enhance knowledge of basic principles of science and Chemical Engineering.	I,
2	To solve Chemical Engineering problems considering safety, environmental and social aspects.	III,V
3	Develop entrepreneurial qualities, soft skills and promote lifelong learning.	VI,VII

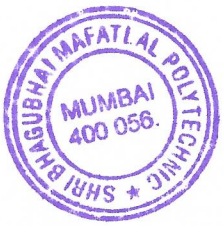
MAPPING OF PROGRAMME SPECIFIC OUTCOMES AND PROGRAMME OUTCOMES

Sr. No.	Programme Specific Outcomes (PSOs)	Programme Outcomes (POs)
1	PSO 1: To Apply Core concepts of unit process and unit operation in process industries to operate the equipment and using materials effectively.	I,II,III,IV,V,VI,VII
2	PSO 2: To lay drafting of PFD, ULD, P&ID, for chemical process plant using AutoCAD	III,IV,V,VI,VII

MAPPING OF PROGRAMME OUTCOME AND COURSES

POs 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 Applied Physics Applied Chemistry Organic and Physical Chemistry Engineering Drawing Engineering Mathematics Fundamental of Chemical Engineering
2	Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.	Applied Mathematics Numerical Methods in Chemical Engineering Principles of Stoichiometry Chemical Engineering Thermodynamics Basics of Electrical & Electronics
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.	Applied Mechanics Introduction to Energy System #Mass Transfer Operation Fluid Flow Operation Heat Transfer Operation Process Equipment Drawing
4	Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and	#Chemical Reaction Engineering Technology Of Plastics Mechanical Operation #Plant Utilities #Process Instrumentation and Control
5	Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.	#Plant Safety & Loss Prevention #Pollution Control & Waste Disposal Technology of Inorganic & Organic Chemicals Petroleum Refining and Petrochemicals Environmental Studies Workshop Practice [CH]

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.	#Project CADD and Estimation Piping in Chemical Engineering Project Management #Industrial Management
7	Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.	Development of life Skills Communication Skills Stress Management



PROGRAMME - DIPLOMA IN CHEMICAL ENGINEERING
SAMPLE PATH
ENTRY LEVEL 10+

Nature of Course	First Year		Second Year		Third Year		Total
	Odd Term	Even Term	Odd Term	Even Term	Odd Term	Even Term	
Compulsory	BMT 190001 (05)	EMT 190009 (05)	AMT 190013 (04)	CRE 190608 (06)	Inplant Training IPT190625	PIC 190616 (06)	
	ACH 190002 (06)	DLS 190004 (03)	MOP 190603 (06)	POS 190609 (05)		MTO 190617 (06)	
	EVS 190003 (02)	APH 190010 (06)	TIC 190604 (06)	PED 190610 (06)		PRO 190618 (06)	
	CMS 190011 (04)	OPC 1906011 (05)	FFO 190605 (05)	PUT 190611 (05)		PRP 190619 (06)	
	APM 190005 (06)	BEE 190016 (06)	HTO 190606 (05)	IMG 190014 (03)			
	EDG 190006 (06)	FCE 190602 (06)					
	WSP 190624 (04)						
Total credits (COMPULSORY)	**33**	31	**26**	**25**	**20**	**24**	**159**
Elective	--	--	--	Any **ONE From elective I** 1 PSL 190612 (05)		Any **ONE** from **Elective: II:** 1 CAD 190620 (06)	
				2 PCW 190613 (05)		2 PCE 190621 (06)	

Total Credits (Elect.)	---	---	---	05	--	06	11
OPTIONAL	---	STM 190012 (02)	TOP 190503 (05) MOC 190607 (05)	CET 190614 (03) IES 190615 (03)		NMC 190622 (04) PMG 190623 (04)	
Total Credits (OPTIONAL.)	---	02	10	06	----	08	26
Total Courses	7	7	7	08	01	07	37
Total Credits (Comp+Elect+OPT)	33	33	36	36	20	38	196
Grand Total of Credits							196

Note: Figures in bracket indicates total credits.

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

PROGRAMME: Chemical Engineering | **With effect from batch admitted June, 2019(Progressively)**

SEMESTER: I | **Duration:16 Weeks**

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		ExaminationSchemeandMaximumMarks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
1-1	Basic Mathematics (BMT 190001)	3	-	-	2	5	03	70	20	10	70	25	-	-	125	B*	325
1-2	Applied Chemistry (ACH 190002)	4	2	-	-	6	01	@70	20	10	70	25	50	-	175	B*	426
1-3	Environmental Studies (EVS 190003)	2	-	-	-	2	-	-	-	-	-	50	-	-	50	B*	202
1-4	Communication Skills (CMS 190011)	3	-	-	1	4	03	70	20	10	70	25	-	-	125	B*	314
1-5	Applied Mechanics (APM 190005)	3	2	-	1	6	03	70	20	10	70	50	-	-	150	C*	336
1-6	Engineering Drawing (EDG 190006)	2	-	4	-	6	-	-	-	-	-	50	50	-	100	C*	246
1-7	Workshop Practice (CH) (WSP 190624)	-	4	-	-	4	-	-	-	-	-	50	-	-	50	C*	044
	TOTAL	17	8	04	4	33	No of papers=4		80	40	280	275	100	-	775		17/16/33
		TOTAL PERIODS = 33											TOTAL MARKS = 775				

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 onattendance, 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 BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

PROGRAMME: Chemical Engineering | **With effect from batch admitted June, 2019(Progressively)**

SEMESTER:II | **Duration:16 Weeks**

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		ExaminationSchemeandMaximumMarks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
2-1	Engineering Mathematics (EMT 190009)	3	-	-	2	5	03	70	20	10	70	25	-	-	125	B*	325
2-2	Development of life skills (DLS 190004)	2	-	-	1	3	--	--	--	-	--	50	-	50	100	B*	213
2-3	Applied Physics (APH 190010)	4	2	-	-	6	01	@70	20	10	70	25	50	-	175	B*	426
2-4	Organic and physical Chemistry (OPC 190601)	3	2	-	-	5	03	70	20	10	70	25	50	-	175	C*	325
2-5	Basics of Electrical & Electronics (BEE 190016)	4	2	-	-	6	03	70	20	10	70	25	--	25	150	B*	426
2-6	Fundamentals of Chemical Engineering (FCE 190602)	4	2	-	-	6	03	70	20	10	70	25	50	--	175	C*	426
2-7	Stress Management (STM 190012)	-	2	-	-	2	-	-	-	-	-	-	-	-	-	M	022
	TOTAL	20	10	-	3	33	No of papers=5		100	50	350	175	150	75	900		20/13/33
		TOTAL PERIODS = 33													TOTAL MARKS = 900		

Theory and practical periods of 1 Hour duration each* Compulsory, # Award Winning, @Online Examination

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TEACHING AND EXAMINATION SCHEME

PROGRAM: Chemical 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)		ExaminationSchemeandMaximumMarks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
3-1	Applied Mathematics (AMT 190013)	3	-	-	1	4	03	70	20	10	70	25	-	-	125	C*	314
3-2	Mechanical Operation (MOP 190603)	4	2	-	-	6	03	70	20	10	70	25	50	-	175	C*	426
3-3	Technology of Inorganic & Organic Chemicals (TIC 190604)	4	2	-	-	6	03	70	20	10	70	25	50	-	175	C*	426
3-4	Fluid Flow operation (FFO 190605)	2	2	-	1	5	03	70	20	10	70	25	50		175	A*	235
3-5	Heat Transfer Operation (HTO 190606)	2	2	-	1	5	03	70	20	10	70	25	50		175	A*	235
3-6	Technology of plastics (TOP 190503)	3	2	-	-	5	03	70	20	10	70	25	50	-	175	C	325
3-7	Material of Construction (MOC 190607)	3	2	-	-	5	03	70	20	10	70	25	-	-	125	C	325
	TOTAL	21	12	-	3	36	No of papers=7		140	70	490	175	250		1125		21/15/36
		TOTAL PERIODS = 36													TOTAL MARKS = 1125		

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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Head of Department **Controller of Examination** **Secretary CDC** **Principal**

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

PROGRAMME: Chemical Engineering — **With effect from batch admitted June, 2019(Progressively)**

SEMESTER: IV — **Duration:16 Weeks**

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		ExaminationSchemeandMaximumMarks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
4-1	#Chemical Reaction Engineering (CRE 190608)	4	2	-	-	6	03	70	20	10	70	50	50		200	C*	426
4-2	Principles of Stoichiometry(POS 190609)	4	-	-	1	5	03	70	20	10	70	50	-	-	150	C*	415
4-3	Process Equipment Drawing (PED 190610)	2	-	4	-	6	---	---	--		---	50	50	-	100	C*	246
4-4	#Plant Utilities (PUT 190611)	3	2	-	-	5	03	70	20	10	70	50	50		200	A*	325
4-5	# Industrial management (IMG 190014)	3	-	-	-	3	03	70	20	10	70	-	-	-	100	M*	303
4-6	# Elective I (Any One)																
	A) Plant Safety & Loss prevention (PSL 190612)	3	2	-	-	5	03	70	20	10	70	50	-	50	200	M*	325
	B) Pollution Control & Waste Disposal (PCW 190613)	3	2	-	-	5	03	70	20	10	70	50	-	50	200	M*	325
4-7	Chemical Engineering Thermodynamics (CET 190614)	3	-	-	-	3	03	70	20	10	70	25	-	-	125	C	303
4-8	Introduction to energy system(IES 190615)	3	-	-	-	3	03	70	20	10	70	25	-	-	125	C	303
	TOTAL	25	6	4	1	36	No. of papers = 7		140	70	490	300	150	50	1200		25/11/36
		TOTAL PERIODS = 36													TOTAL MARKS = 1200		

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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TEACHING AND EXAMINATION SCHEME

PROGRAMME: Chemical 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 (IPT 190625)	26Weeks **	20	**Maximum Marks**	50	50	50	50	200	A*
				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: Chemical Engineering — **With effect from batch admitted June, 2019(Progressively)**

SEMESTER: VI — **Duration:16 Weeks**

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		ExaminationSchemeandMaximumMarks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
6-1	#Process Instrumentation & Control (PIC 190616)	4	2	-	-	6	03	70	20	10	70	50	50	-	200	A*	426
6-2	# Mass Transfer Operation (MTO 190617)	3	2	-	1	6	03	70	20	10	70	50	50	-	200	A*	336
6-3	# Project (PRO 190618)	-	6	-	-	6	-	-	-		-	50	-	50	100	A*	066
6-4	Petroleum Refining & Petrochemicals (PRP 190619)	4	2	-	-	6	03	70	20	10	70	50	-	-	150	A*	426
6-5	# Elective –II (Any One)																
	A) CADD& Estimation (CAD 190620)	2	4	-	-	6	03	70	20	10	70	50	50	-	200	A*	246
	B) Piping in Chemical Engineering (PCE 190621)	2	4	-	-	6	03	70	20	10	70	50	50	-	200	A*	246
6-6	Numerical Methods in Chemical Engineering (NMC 190622)	3	-	-	1	4	03	70	20	10	70	25	-	-	125	A	314
6-7	Project Management (PMG 190623)	3	-	-	1	4	03	70	20	10	70	25	-	-	125	M	314
	TOTAL	19	16	-	3	38	No. of papers= 6		120	60	420	300	150	50	1100		19/19/38
		TOTAL PERIODS = 38													TOTAL MARKS = 1100		

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 onattendance, 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 KelavaniMandal`s

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

TEACHING AND EXAMINATION SCHEME

LIST OF AWARD WINNING COURSES

PROGRAMME: Chemical 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)		ExaminationSchemeandMaximumMarks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
1	#Chemical Reaction Engg. (CRE 190608)	4	2	-	-	6	03	70	20	10	70	50	50	-	200	C*	426
2	#Plant Utilities (PUT 190611)	3	2	-	-	5	03	70	20	10	70	50	50	-	200	A*	325
3	# Industrial management (IMG 190014)	3	-	-	-	3	03	70	20	10	70	-	-	-	100	M*	303
4	# Elective- I (ANY ONE)																
	A) Plant Safety & Loss prevention (PSL 190612)	3	2	-	-	5	03	70	20	10	70	50	-	50	200	M*	325
	B) Pollution Control & Waste Disposal (PCW 190613)	3	2	-	-	5	03	70	20	10	70	50	-	50	200	M*	325
5	#Process Instru. & Control (PIC 190616)	4	2	-	-	6	03	70	20	10	70	50	50	-	200	A*	426
6	# Mass Transfer Operations (MTO 190617)	3	2	-	1	6	03	70	20	10	70	50	50	-	200	A*	336
7	# Project (PRO 190618)	-	6	-	-	6	-	-	-		-	50	-	50	100	A*	066
8	# Elective Group-II (ANY ONE)																
	A) CADD & Estimation(CAD 190620)	2	4	-	-	6	04	70	20	10	70	50	50	-	200	A*	246
	B) Piping in Chemical Engineering(PCE 190621)	2	4	-	-	6	03	70	20	10	70	50	50	-	200	A*	246
9	Inplant Training (IPT 190625)	-	-	-	-	20	-	-	-	-	-	50	-	50	100	A*	-/-/20
	TOTAL	22	20		1	43+20	No.of Papers=7		140	70	490	400	250	150	1500		22/21/43+20
		TOTAL PERIODS = 43														TOTAL MARKS = 1500	

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
Vile Parle (W) Mumbai-400056

Credit Summary for 2019 Scheme

Programme: Chemical 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	
B	17		20										37
C	16		11		16	10	17	6					76
A					10		05		20		30	4	69
M				02			08					4	14
Total	33	0	31	02	26	10	30	6	20	0	30	8	196

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

Head of Department

Controller of Examination

Secretary CDC

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Principal

Shri Vile Parle Kelavani Mandal's

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

Vile Parle (W) Mumbai-400056

Programme: With effect from June,2019

Credit Summary

Group	Max. Credit	Compulsory Credit	Optional Credit	Remark
B = Basic	37	37	-	
C = Core	76	60	16	
A= Application	49+20	45+20	04	20 Credit In-plant
M = Management	14	08	06	
Total	**176+20**	150+20	26	

Compulsory Credit : 150

Optional Credit : 26

Inplant Training Credit : 20

TOTAL CREDIT : 196

Head of Department **Controller of Examination** **Secretary CDC** **Principal**

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056.

RATIO OF THEORY :PRACTICAL		
Total Theory Crédits Offered	Total Practical Credits Offered	Theory : Practical
102	94	52 : 48
Total Theory Credits (Award Winning)	Total Practical Credits(Award Winning)	
22	41	35 :65
Total TH/SSL Exam Marks for Offered Courses	Total TA/TW/PR/OR Exam Marks for Offered Courses	
2610	2590	50 : 50
Total TH/SSL Exam Marks for Award Winning Course	Total TA/TW/PR/OR Exam Marks for Award Winning Courses	
630	770+100	42 : 58

	Total Credits/Marks offered					Award winning Credits/Marks			
Semester	Theory credits	Marks	Practical credits	Marks		Theory credits	Marks	Practical credits	Marks
Semester I	17	360	16	415		-	-	-	-
Semester II	20	450	13	450		-	-	-	-
Semester III	21	630	15	495		-	-	-	-
Semester IV	25	630	11	570		13	360	06	340
Semester V	-	-	20	100		-	-	20	100
Semester VI	19	540	19	560		9	270	15	430
Total	102	2610	94	2590		21	630	41	870

Head of Department

Controller of Examination

Secretary CDC

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056.

Principal

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/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

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. Ghosh	
		Organaisation: Vidyavardhini's Vidyalankar 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

Program: CE/ME/PL/CH	**Semester:** I
Course: Applied Mechanics	**Group:** C*
Course Code: APM190005	**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	-	1	6	03	70	20	10	70	50	-	-	150

3. COURSE OBJECTIVE

Applied Mechanics course is to study of forces and their effect on moving or stationarybodies, to understand the principles and laws of mechanics, to understand the applications of these principles and laws in various engineering applications. Also, the concept of Mechanics will be prerequisite subject to further courses like materials & structures, analysis of structures and design of structures.

4. SKILL COMPETENCY

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

- Apply concepts and behavior of forces on the structures
- Analyze the structure for the loads acting on it in terms of its resultant force, equilibrant force and stability through centre of gravity
- Apply the concept of lifting machines

5. COURSE OUTCOMES (COs)

At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's Level
1.	Resolve force and force system along with the classification for given conditions by applying the basis of mechanics	R, U
2.	Calculate the resultant and equilibrant of system of forces analytically and graphically.	R,U,A
3.	Apply principles and conditions of equilibrium and calculate the reactions at surface of contact.	R,U,A
4.	Apply and calculate force systems to friction, centroid and beam reactions	R,U,A
5.	Calculate and apply velocity ratio, Mechanical Advantage, Frictional losses and efficiency of simple lifting machines.	R,U,A

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

6. COURSE CONTENTS

Sr. No.	Topic / Sub-topics	Hours	Marks	CO No.
1	**1. Introduction and fundamentals of force system:** 1.1 Mechanics definition, classification, statics & dynamics, kinematics, kinetics 1.2 Fundamental units of measurements (FPS, MKS, SI), derived Units, Conversion of units, Scalars & Vectors with examples 1.3 Definition of particle, body and rigid body, mass & weight. 1.4 Concept of force, definition, unit, graphical representation of force, 1.5 Concept of system of forces, non-coplanar, coplanar, concurrent, Parallel, non-concurrent & non-parallel forces	4	5	CO1

2	**2. Resolution and Composition of forces:** 2.1. Resolution of a force into two components along any direction. 2.2 Resolution of a force into two component straight angles to each other by analytical method. 2.3 Composition and Resultant of force 2.4 Law of parallelogram of forces, 2.5 Moment of force, couples lever arm, 2.6 Varignon's theorem 2.7. Resultant of coplanar concurrent, parallel, and non- concurrent, non-parallel forces	7	10	CO2, CO3
3	**3. Equilibrium** 3.1 Definition of equilibrant, relation between Resultant and Equilibrant, Conditions of Equilibrium, Types of Equilibrium (Stable, Unstable and Neutral equilibrium) 3.2 Equilibrium of coplanar concurrent forces, Lami's theorem 3.3 Equilibrium of coplanar parallel forces & coplanar Non-concurrent Forces. 3.4Analytical conditions of equilibrium for coplanar concurrent & Non-concurrent Forces.	7	10	CO2, CO3
4	4. **Beam Reactions** 4.1 Types of supports: simple, roller hinged & fixed. 4.2 Types of Beams: simply supported, hinged & roller Supported, Cantilever, Overhang Beams 4.3 Types of Loads: Point (Concentrated) Load, Uniformly Distributed Load (UDL) 4.4 Problems on above combination of loads.	6	10	CO4

5	**5. Friction:** 5.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction, angle of repose and coefficient of friction, cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. 5.2 Equilibrium of bodies on level plane -external force applied horizontal and inclined up and down. 5.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, 5.4 Ladder Friction	7	10	CO4
6	**6. Centroid and Centre of Gravity:** 6.1 Definition of Centre of gravity of solids and centroid of plane laminas 6.2 Concept of parallel forces applied to find c.g. and centroid, centroid /c.g. axes of a body / lamina, c.g. / centroid of basic regular Shapes. (Applications like floating bodies, dams & retaining wall sections, beams, columns sections (rolled steel), simple and built up sections)	7	10	CO4
7	**7. Graphics Statics** 7.1 Space diagram, Bows notation. 7.2 Law of Triangle of forces, Polygon of forces, Force/ Vector diagram 7.3 Resultant and equilibrium of concurrent forces 7.4 Polar diagram, Funicular polygon 7.5Resultant and equilibrium of non–concurrent and nonparallel forces (Applications in finding reactions of beams)	5	7	CO3

8	**8. Simple Lifting Machine:** 8.1 Definition: Mechanical Advantage, Velocity Ratio, Efficiency, Relation between M.A., V.R. and Efficiency, Friction in machine in terms of load & Effort. 8.2 Law of Machine, Maximum M.A., Maximum efficiency, Condition for reversibility of a machine	5	8	CO5
	TOTAL	**48**	**70**	

7. LIST OF PRACTICALS & TUTORIALS

Termwork consists of Journal containing minimum 10 nos. of experiments and 8 nos. of tutorials with approximate number of hours required and corresponding COs as mentioned below

Sr. No.	Title of Experiment	Approx.Hrs required	COs
1.	Study of Compression of spring, calculation of spring constant and verification of Hook's Law	2	CO1
2.	Study of bell crank lever and verification of condition of equilibrium.	2	CO 2
3.	Theory of Simple Lifting Machine	2	CO 5
4.	Study of Simple screw jack and to find law of machine.	2	CO 5
5.	Study of Differential axel & wheel and to find law of machine.	2	CO 5
6.	Study of Single purchase crab and to find law of machine.	2	CO 5
7.	Study of Three sheave pulley and to find law of machine.	2	CO 5
8.	Resultant of nonparallel nonconcurrent forces.	2	CO 3
9.	Calculating Coefficient of Friction	2	CO 4
10.	Calculating Angle of Repose	2	CO 4
11.	Calculating Centroid of Plane Lamina 1	2	CO 4
12.	Calculating Centroid of Plane Lamina 2	2	CO 4
13.	Calculating Centroid of Plane Lamina 3	2	CO 4
14.	Graphics statics	6	CO 3

Sr. No.	Title of Tutorial	Approx.Hrs required	COs
1.	Tutorial on Introduction and fundamentals of force system	1	CO 1
2.	Tutorial on Resolution and Composition of forces	2	CO 2
3.	Tutorial on Equilibrium	2	CO 3
4.	Tutorial on Beam Reactions	2	CO 4
5.	Tutorial on Friction	2	CO 4
6	Tutorial on Centroid and Centre of Gravity	2	CO 4
7	Tutorial on Graphics Statics	3	CO 2
8	Tutorial on Simple Lifting Machine	2	CO 5

8. IMPLEMENTATION STRATEGY (PLANNING)

1.Teaching Plan/Tutorials

2. Self-Learning Online Resources

3. Slides / Presentations

9. SUGGESTED LEARNING RESOURSES

Sr.No.	Title of Book	Author	Publication
1.	Applied Mechanics	Dhade & Jamdar	Central Techno Publishers, Nagpur
2.	Applied Mechanics	R.S. Khurmi	S. Chand & Company Ram Nagar ,New Delhi–110055
3.	Engineering Mechanics Statics & Dynamics	A.K. Tayal	Umesh Publications
4	Applied Mechanics Vol.I&II	Sunil M Deo	Nirali / Pragati Publications
5	Applied Mechanics	M D Dayal	Nandu Publishers Chembur, Mumbai-71.
6	Applied Mechanics	S.S.Bhavikatti	Tata Mcgraw Hill

10. WEB REFERENCES

1.www.nptel.ac.in

2.www.discovery for engineers.com

3.www.swayam.gov.in

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	CHAPTER	Distribution of Theory Marks			
		R Level	U Level	A LEVEL	Total Marks
1.	**Introduction and fundamentals of force system**	03	02	-	5
2.	**Resolution and Composition of forces**	02	02	06	10
3.	**Equilibrium**	02	02	06	10
4.	**Beam Reactions**	02	02	06	10
5.	**Friction**	02	02	06	10
6.	**Centroid and Centre of Gravity**	02	02	06	10
7.	**Graphics Statics**	01	02	04	7
8.	**Simple Lifting Machine**	02	02	04	8
TOTAL		**16**	**16**	**38**	**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. Neelam N. Petkar	
2	Internal	Mr. A. K. Singh	
3	Internal	Mr. K.P. Jayateerth	
4	External	Mr. DHIRAJKUMAR S. PANDIRKAR	
		Organization: MHADA	

1. COURSE DETAILS

Programme: Chemical/Plastic Engineering	Semester: I
Course: Engineering Drawing	Group: C*
Course Code: EDG190006	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	--	04	--	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, non-sectional views of given object using principles of orthographic projections and isometric views of given component or from orthographic projections.	Remember, Understand, Apply
CO2	Draw geometric figures and conic curves.	Remember, Understand
CO3	Draw projections of 2D and 3D standard regular entities.	Remember, Understand, Apply
CO4	Prepare free hand sketches of thread profiles and thread fasteners.	Remember, Understand

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	---	CO2
2	**Engineering curves** Conic Sections: 2.1 Ellipse: Introduction and Methods to draw an ellipse by oblong, arcs of circle and concentric circle methods. 2.2 Parabola: Introduction and Methods to draw parabola by Directrix-Focus and rectangular methods. 2.3 Hyperbola: Introduction and Methods to draw hyperbola by Directrix-Focus and rectangular methods	04	06	CO2
3	**Orthographic projections** 3.1 Introduction to orthographic and isometric projections, concept and applications. 3.2 Orthographic projection by First angle and Third angle method, and their symbols. 3.3 Conversion of Pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. 3.4 Introduction to Cutting plane line, Hatching Line and Sectioning Conventions. 3.5 Types of sectional views: Half, Full and Off-set sectional Views. 3.6 Conversion of pictorial views into sectional orthographic views	08	14	CO1
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).	07	12	CO1

5	**Projection of planes** 5.1 Projection of Planes- Projections of regular polygons and circle-inclined to one reference plane and perpendicular to another. 5.2 Reverse problems with true shape given and derive the inclination of the plane.	03	06	CO3
6	**Projections of solids** 6.1 Types of solids- Polyhedron and solids of revolutions 6.2 Projection of regular solids like prisms, pyramids, cylinders and cones with axis – i) Perpendicular to one of the reference planes, parallel to another ii) inclined to one reference plane and perpendicular to another.	04	08	CO3
7	**Free hand sketches** **Thread Profiles and Screw Fasteners.** 7.1 Different thread profiles 7.2 Conventional representations of left hand – right hand threads, single and multistart square threads, external and internal threads. 7.3 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
	TOTAL	**32**	**50**	

7. LIST OF ASSIGNMENTS / DRAWINGS

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

Sr. No.	Title of Assignment/Drawings	Approximate Hrs. required	COs
01	One sheet on lettering, lines, dimensioning techniques and geometrical constructions.	04	CO2
02	One sheet with four problems on ellipse, parabola and hyperbola.	04	CO2
	Home Assignments: Four problems in sketchbook		
03	One sheet with four problems on non-sectional orthographic views for the objects with curvilinear features	12	CO1
	Home Assignments: Four problems in sketchbook		
04	One sheet with four problems on Sectional orthographic projections with full and half section.	14	CO1
	Home Assignments: Four problems in sketchbook		
05	One sheet with four problems on Isometric views and projections.	10	CO1
	Home Assignments: Four problems in sketchbook		
06	One sheet with four problems on projections of planes.	06	CO3
	Home Assignment: Four problems in sketchbook.		
07	One sheet with four problems on projections of solids.	08	CO3
	Home Assignment: Four problems in sketchbook.		
08	One sheet on free hand sketches of Thread Profiles and Screw Fasteners	06	CO4
	Home assignments: Free hand sketches in sketchbook		

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

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

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri N.M.Pathak	
2	Internal	Shri Sachin Kamble	
3	Internal	Shri Nilesh Nagose	
4	External	Dr. Manishkumar S. Tiwari	
		Organization : MPSTME	

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056

1. COURSE DETAILS

Programme: Chemical Engineering	**Semester: I**
Course: Workshop Practice (CH)	**Group: C***
Course Code: WSP 190624	**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

1. Know safety precautions while working on various machines.
2. Understand, select and use of various tools and equipments in fitting, carpentry, welding and plumbing.
3. Read and interpret job drawings.
4. Operate, control different machines and equipments.
5. Inspect the jobs for specified dimensions
6. Produce jobs as per specified dimensions.

4. SKILL COMPETENCY

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 safe practices.

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 marking, measuring, holding, striking and cutting tools & equipment.	Applying
CO2	Explain various manufacturing processes for industrial product.	Understanding
CO3	Use various workshop equipment and tools for different workshop jobs.	Applying
CO4	Recall safety practices while working in industry.	Remembering

6. COURSE CONTENTS

Sr.No.	Topic / Sub-Topics	Hours	Marks	COs
1	**Fitting :** **Practical Content:** 1.1 Demonstration of safety equipments & their working, safety precautions, First aid, safety rules in workshop, layout of workshop, Issue and return system of lockers 1.2 Introduction, Various Marking, Measuring, Cutting, Holding and Striking tools 1.3 Introduction to Vernier caliper, it's working and use 1.4 Different Fitting operation like Chipping, Filing, Right angle, Drilling, Tapping 1.5 Working principle of Drilling machine, Tapping dies and its use. 1.6 Demonstration of different Fitting Tools and Drilling Machines, lathe machine 1.7 Demonstration of different operations like Chipping, Filing, Drilling, Tapping, Cutting etc. 1.8 One Fitting assembly job for per student as per drawing involving practice of Chipping, Filing, Drilling, Tapping, Cutting operations.	20	15	CO1 CO2 CO3 CO4

2	**Welding:** **Practical Content:** 1.1 Introduction of welding, 1.2 Types of welding joints, arc welding, 1.3. Demonstration of different welding tools / machines 1.4. One job of Arc Welding processes for per student as per drawing.	18	15	CO1 CO2 CO4
3	**Pipe Joints and Pipeline Layout:** **Practical Content:** 1.1 Introduction, Various marking, measuring, cutting, holding and striking tools. 1.2 Different G.I. pipes. PVC pipes 1.3. G. I. pipes and PVC pipe fittings and accessories, Selection and installation of valves in pipe line. 1.4. Demonstration of different plumbing tools. 1.5 Observing different pipe joints and pipe accessories, different samples of PVC pipes and PVC pipe fittings. 1.6. One job I group covering: Prepare pipeline layout with different pipe fitting and valves as per drawing followed by practice by group of students.	12	10	CO1 CO2 CO4
4	**Sheet Metal:** **Practical Content:** 1.1 Introduction 1.2. Various marking, measuring, cutting, and striking tools. tools, equipments and accessories. 1.3 Demonstration of different types sheet metal tools 1.4. Demonstration of different types of operations in sheet metal shop. 1.5. welding 1.6. One job in group covering different operations in sheet metal as per drawing followed by practice by group of students	14	10	CO1 CO2 CO4
	TOTAL	64	50	

7. PRACTICALS

1] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

2] The workshop diary/journal shall be maintained by each student duly signed by instructor of respective shop.

3] Workshop diary/Journal should contain the following:

a. safety precautions in workshop.

b. Part Drawings/Designs of the job and procedure/methodology adopted for making

i) Job on fitting.

ii) Job on Welding.
iii) Job on Piping.
iv) Job on Sheet metal.

4] Workshop diary/Journal should be certified by the incharge chargeman/ foreman.

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Demonstrations.
2. Preparation of jobs

9. LEARNING RESOURSES

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

10. WEB REFERENCES

1. http://files.kvsrcse.webnode.in/200000118-deb8cdfb49/carpen%20tools.pdf
2. https://www.bvrit.ac.in/Freshman_Lab_Manuals/Engineering%20Workshop/Engineering%20Workshop.pdf
3. http://www.bspublications.net/downloads/05229cf9b012a3_workshop_Ch_1.pdf
4. https://www.wilhelmsen.com/globalassets/marine-products/welding/documents/wilhelmsen-ships-service---unitor-welding-handbook.pdf
5. http://ecsnz.com/cimco/downloads/CIMCO_2017-18_plumbing-tools.pdf
6. http://infohouse.p2ric.org/ref/36/35594.pdf
7. https://www.weldingtechnology.org

11.COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	M.M.BELWALKAR	
2	Internal	N. R. NAGOSE	
3	Internal	R.D.SHIMPI	
4	External	R.O.NARKHEDE	
		Organization: Datta Meghe College of Engineering	

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056

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: 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: 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 : PE/ CHE	**Semester: II**
Course : Organic and Physical Chemistry	**Group: C***
Course Code :OPC190601	**Duration:16 Weeks**

2. TEACHING AND EXAMINATION SCHEME

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

3.COURSE OBJECTIVE

The course of organic physical chemistry comprises of organic chemistry and physical chemistry and is offered to Plastic engineering and Chemical engineering programs. Organic chemistry helps to develop an understanding and appreciation of both structure and chemical transformations of organic molecules. The fundamental principles in physical chemistry that govern the various chemical processing systems are explained through topics like phase rule, adsorption, colloids and colligative properties. Basic concepts like concentration and behaviour of solutions are included to improve their experimental skills required in the laboratory and also in chemical processing units.

4.SKILL COMPETENCY

Following skills are acquired

- Identify the concepts of physical chemistry involved in various industrial processes.
- Techniques of identification and analysis of organic compounds.
- Accuracy in recording and record keeping.
- Safety precautions for handling of reagents and glassware.

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

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Select an appropriate organic compound for various processes.	Remember, Apply
CO2	Predict the chemical behaviour of different organic compounds and carry out conversions of organic compounds.	Remember, Understand, Apply

CO3	Use the concept of solutions, colloidal solutions, buffer solutions and colligative properties in industry.	Understand, Apply
CO4	Apply the concept of the phase diagram and Distribution Law for separation of chemicals.	Understand, Apply
CO5	Use the principle of adsorption in purification and separation processes.	Remember,Understand,Apply

6.COURSE CONTENT

Sr.No.	TOPIC/ Sub-Topics	Hours	Marks	COs
1	**1. Fundamentals of Organic Chemistry** 1.1 Classification of organic compounds 1.2 Nomenclature of Organic Compounds 1.3 Functional Groups 1.4 Homologous Series 1.5 IUPAC System 1.6 Structure 1.7 Valency of Carbon 1.8 sp3, sp2, sp hybridization of Carbon 1.9 Fundamental concepts in organic reaction mechanism: 1.10 Inductive effect and electrometric effect 1.11 Resonance in Benzene 1.12 Bond Fission – Homolytic, Heterolytic and Free radical fission 1.13 Carbocation and Carbanion 1.14 Types of Reagents – Electrophilic and Nucleophilic 1.15 Types of Organic Reactions – Substitution, Addition, 1.16 Elimination, Rearrangements.	08	15	CO1
2	**2. Alkanes, Alkenes, Alkynes & Cycloalkanes** 2.1 Study of Organic Compounds – Preparation, Properties & Uses of following Compounds 2.2 Aliphatic Compounds 2.3 Methane, Ethane, Chloromethane, Chloroethane 2.4 Ethene, Ethyne 2.5 Methyl Alcohol, Ethyl Alcohol, 2.6 Acetaldehyde, Acetone 2.7 Formic Acid, Acetic Acid	08	10	CO2
3	**3.Aromatic compound** 3.1 Benzene, Toluene 3.2 Phenol 3.3 Benzaldehyde 3.4 Benzoic Acid 3.5 Nitrobenzene 3.5 Aniline	08	10	CO2

	TOPIC/Sub-topic	Hours	Marks	COs
4	**4.Solutions & Indicators** **4.1**Definition, concentration (Molarity, Normality, Molality and Mole fractions) Ideal Solution Raoult's law for dilute solution (Only derivation, No numerical problem) Theory of dilute solutions **4.2 Colligative Properties:** Relative lowering of Vapour pressure, Elevation of Boiling Point, Freezing Point Depression, Raoult's law of relative lowering of vapour pressure (Only derivation, No numerical problem) **4.3 Hydrolysis and buffer solutions:** Concepts of Acids and Bases – Lowry Bronsted theory, Conjugate Acids and Bases, Lewis' theory. pH and pOH of solution, Buffer solution Solubility product, hydrolysis, degree of hydrolysis, hydrolysis constant, relation between hydrolysis constant and dissociation constant Only derivation, No numerical problem)	10	15	CO3
5	**5.Adsorption & Colloids** **5.1**Definition, example, Mechanism of adsorption,Types of adsorption Physical adsorption, chemical adsorption, differencebetween physical & chemical adsorption Adsorption isotherm: Freundlich adsorption isotherm,Langmuir adsorption isotherm Application of adsorption **5.2 Colloidal state:** Preparation, purification and properties of colloidal solutions, stability and coagulation of colloids.	8	10	CO4
6	**6.Heterogene-ous Systems** **6.1 Nernst' distribution law:** Calculation of partition coefficient, deviation from Nernst' distribution law, applications. (No Numerical problem) **6.2 Phase rule:** Terms involved, statement, phase diagram of water and Sulphur system.	6	10	CO5
	TOTAL	**48**	**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
1	Determination of melting point of solids and boiling points of liquids	04	CO1
2	Detection of elements C,H,N,S halogen by Na-fusion test	04	CO1
3-10	Detection of following organic compounds: Ethyl alcohol, Urea, Phenol, Acetic acid, Benzoic acid, Salicylic acid, Citric acid, Benzaldehyde, Nitrobenzene, Aniline.	20	CO2
11	Preparation of buffer solutions	02	CO3
12	Preparation of Solutions of different Normality.	02	CO3,CO5
13	Study of hydrolysis of salts	02	CO4

8. IMPLEMENTATION STRATEGY (PLANNING)

1.Teaching Plan
2. Minimum no. of 10 practical
3. Self-Learning Online Resources

9. LEARNING RESOURSES

Sr. No.	Title Of Book	Author	Publication
1.	Organic Chemistry	Raichura Paveri	Sheth Publishers
2.	Organic Chemistry	Bahl and Bahl	S.Chand & Co. New Delhi
3.	Organic Chemistry	P.L. Soni	S.Chand & Co. New Delhi
4	Physical Chemistry	Puri & Sharma	S. Nagin & Co. Jullundar
5	Physical Chemistry	Sharma & Sharma	Vani Education Books, New Delhi
6	Physical Chemistry	P.L.Soni	S.Chand & Co. New Delhi

10. WEB REFERENCES

- http://www.chem.uiuc.edu/GenChemReferences/nomenclature_rules.html
- https://www.toppr.com/guides/chemistry/surface-chemistry/preparation-of-colloids/
- http://www.sparknotes.com/chemistry/solutions/colligative/section1/
- https://serc.carleton.edu/research_education/equilibria/phaserule.html
- https://www.chem.purdue.edu/gchelp/howtosolveit/Solutions/concentrations.html

11.SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Fundamentals of Organic Chemistry	06	09	-	15
2	Alkanes, Alkenes, Alkynes & Cycloalkanes	06	04	-	10
3	Aromatic compound	06	04	-	10
4	Solutions & Indicators	07	04	04	15
5	Adsorption and colloids	04	03	03	10
6	Heterogeneous Systems	06	04	-	10
TOTAL		35	28	07	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. Chavi	
		Organaisation: Mucchala Polytechnic Thane.	

1. COURSE DETAILS

Programme: Chemical/Plastic/Mechanical Engineering	Semester: II/II/III
Course: Basics of Electrical and Electronics	Group: B*
Course Code: BEE190016	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	3	70	20	10	70	25	-	25	150

3. COURSE OBJECTIVE

This Course deals with the basics of Electrical and Electronics Engineering. It aims at making the student familiar with various electrical circuits, electrical machines, electronic components and their applications.

4. SKILL COMPETENCY

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

Use the electrical and electronics equipment in the industry.

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

CO No.	COURSE OUTCOME	Bloom's Level
1	State principles and laws used in basic electrical Engineering.	R
2	Understand the working of different electrical Motors and their applications.	U, A
3	Explain working and applications of the Transformer.	U, A
4	Name the components in electronic circuits	R
5	Explain the need of amplifier and rectifier	U
6	Identify digital electronics circuit	A

6. COURSE CONTENTS

Sr.No.	Topic /Sub-Topics	Hours	Marks	COs
1	**Basic concept and principle of Electrical Engineering** 1.1 Voltage, Electric current, Power and their relation. Resistance, Ohm's Law, Resistance in series and parallel. 1.2 Kirchhoff's Laws (Only statement.) Faraday's Laws of Electromagnetic Induction 1.3 Alternating Current and Voltage. Terms related with alternating quantity. Concept of 1φ & 3φ AC Supply.	10	11	CO1
2	**D.C. Motors** 2.1 Construction and working Principle. 2.2 Types of D.C. Motor. 2.3Significance of back emf.Torque, Speed and back emf (No derivation. Only equation) 2.4 Characteristics & Applications.	7	8	CO2
3	**Transformer** 3.1 Construction and Working Principle. 3.3 Core type & Shell type transformer. 3.4 EMF Equation (simple numerical). 3.5 Turn ratio, Current ratio & Voltage ratio. 3.6 Concept of Auto transformer, 3 φ transformer and their applications.	8	8	CO3
4	**A.C. Motors** 4.1 Classification of A.C motors. 4.2 Principle, construction, Types & Applications of 3φ Induction Motors. 4.3 1φ Induction Motors and their applications.	7	8	CO2
5	**Introduction to Electronics** 5.1 Conductors ,Semiconductors, Insulators (definitions and example) 5.2 Electronic Components :Resistor, capacitors and inductors Symbol ,Working principle , applications and specifications 5.3 Semiconductor: Intrinsic and Extrinsic 5.4 PN Junction diode- Symbol, working, characteristics and applications. 5.5 Zener diode- Symbol, working, characteristics and application. 5.6 Construction and working principle of light emitting diode (LED) 5.7 Bipolar junction transistor (BJT) Symbol construction and working principle of NPN transistor , Characteristics (CE configuration only) Regions cut off, active and saturation. Transistor parameters in CE configuration.	12	12	CO4

6	**Rectifier and filter circuits** 6.1 Rectifier: Half wave , full wave and bridge type circuit, waveform and working. Performance parameters, PIV , ripple factor and efficiency. 6.2 Filter definition. Need for filters Circuit diagram of Capacitor and inductor filter and its working	**6**	**08**	CO5
7	**Amplifier** 7.1 Concept 7.2 Single stage transistor amplifier in CE configuration, circuit, working principle and frequency response	**6**	**06**	CO5
8	**Digital Electronics** 8.1 Digital signal Binary Number system Boolean algebra 8.2 Study of logic gates (AND,OR,NOT,NOR,NAND) symbols and truth table 8.3 Digital displays Seven segment display LED, LCD display (Working principle and application only.)	**8**	**09**	CO6
	Total	**64**	**70**	

7. LIST OF PRACTICALS/ASSIGNMENTS

Term work consists of Journal containing minimum no of 10 experiments

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approx.Hrs required	COs
1	Verification of ohm's law.	2	CO1
2	Verification of Kirchhoff's current law.	2	CO1
3	Verification of Kirchhoff's Voltage law.	2	CO1
4	Voltage ratio test on single phase Transformer.	2	CO3
5	Load test on D.C shunt motor.	2	CO2
6	Study of electronic components	2	CO4
7	Study of PN junction diode characteristics	2	CO4
8	Study of zener diode Characteristics	2	CO4
9	Study of CE configuration	2	CO4
10	Study of Half wave rectifier	2	CO5
11	Study of logic gates	2	CO6
12	Study of full wave rectifier	2	CO5
13	Study of filters	2	CO5

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan.
2. Assignments.
3. Slides.
4. Any other method adopted.

9. LEARNING RESOURSES

Sr. No.	Title Of Book	Author	Publication
1.	Electrical Technology. Volume – I&II	B.L.Theraja	S.Chand and Co. New Delhi.
2	Basic Electrical Engineering	V.N.Mittal	Tata McGraw-Hill. New Delhi.
3	Principles of Electronics	V K Mehta	S Chand and company
4	Digital Electronics	R P Jain	TMH
5	Basic Electonics and Linear circuits	N N Bhargava D C Kulshreshta S C Gupta	T T T I Chandigarh

10. WEB REFERENCES

1) www.nptel.ac.in
2) www.electricaltechnology.org
3) www.electrical4u.com
4) www.learningaboutelectronics.com
5) https://www.electronics-tutorials.ws .

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	**Basic concept and principle of Electrical Engineering**	05	06	-	11
2	**D.C. Motors**	03	03	02	08
3	**Transformer**	03	03	02	08
4	**A.C. Motors**	03	03	02	08
5	**Introduction to Electronics**	06	06	-	12
6	**Rectifier and filter circuits**	02	04	02	08
7	**Amplifier**	02	02	02	06
8	**Digital Electronics**	02	05	02	09
	TOTAL	26	32	12	70

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Shri Dinesh G. Rajmandai	
2	Internal	Shri Nitin G. Farkade	
3	Internal	Shri Nilesh R. Nagose	
4	External	MR. C. K. BERAL	
		Organization : D.J. Sanghvi College of Engg. Vile Parle.	

1. COURSE DETAILS

Program: CH	**Semester: II**
Course: Fundamentals of Chemical Engg.	**Group: C***
Course Code: FCE 190602	**Duration:16 Weeks**

2. TEACHINGAND EXAMINATIONSCHEME

Scheme of Instructions and Periods per week					ExaminationSchemeandMaximumMarks							
TheoryHrs/Week	PracticalHrs/Week	Drawing Hrs/Week	Tutorial Hrs/Week	Credits (L+P+D+T)	Theory Paper Duration and marks		SSL	TA	Theory paper	TWK	PR	OR	Total
					Hours	Marks							
04	02	--	--	06	03	70	20	10	70	25	50	—	175

3. COURSE OBJECTIVE:

Diploma chemical engineers (also called technologists) work as first line managers in chemical process industries. While performing routine activities; knowledge of unit operations and unit processes, basic concepts like pH, solubility, specific gravity, electrical conductivity and methods of expressing composition of solutions and mixtures is necessary. In addition to this, awareness of safe working practices is also necessary for eliminating the causes of accidents. This course is designed to equip the students with necessary knowledge and skills for effectively performing the job role.

4. SKILL COMPETENCY:

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

Use the fundamentals of chemical engineering in chemical industries.

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

CO No.	COURSE OUTCOME	Bloom LEVEL
CO1	Identify the basic concept for the given engineering application.	Remember, Understand, Apply
CO2	Calculate different parameters of chemical engg.	Remember, Understand, Apply
CO3	Determine the different properties of solution.	Remember, Understand, Apply
CO4	Select the relevant unit operations and unit processes for chemical industry.	Remember, Understand, Apply
CO5	Draw the process flow sheet.	Remember, Understand, Apply

6.COURSE CONTENTS

Sr.No.	Topic/Sub-Topics	Hours	Mark	CO No.
1	**Chemistry and Chemical Engineering** 1.1 Evolution of Chemical Engineering, 1.2 Relationship between Chemistry and Chemical engineering 1.3 Definition & use: Rate Data, Scale-up, Design 1.4 Chemical kinetics: Definition, use, relation between chemical kinetics and thermodynamics. 1.5 Reactors: Definition and classification 1.6 Types and application of reactors.	08	08	CO1
2.	**Basic chemical calculations** 2.1Units, dimensions, conversions & Conversion factors. 2.2 concept of mole, weight percentage, mole percentage, normality, Molarity, Molality, vapor pressure, partial pressure, 2.3Dalton's law, Amagat's law. 2.4 Temperature: dry bulb and wet bulb Temperature	12	14	CO2
3.	**Properties of Solution** 3.1 pH and pH Scale: Principle, construction and working of pH meter 3.2Application of pH measurement in industry 3.3Electrical Conductivity and its unit. 3.4 Solubility, 3.5saturation solubility,	16	16	CO3

4	**Unit Operation** 4.1Definition and classifications of Unit operation 4.1.1 Mechanical operations, 4.1.2 electro- Mechanical operation 4.1.3 Thermal Operation 4.1.4 Symbol of Unit operation (as per IS 3232) 4.2 Unit Operation: 4.2.1 Size separation, size reduction, 4.2.2 Filtration, 4.2.3 Mixing, 4.2.4Sedimentation, 4.2.5 Magnetic Separation, 4.2.6 Electro dialysis 4.2.7 Electrostatic Separation 4.2.8 Distillation, 4.2.9 Leaching, 4.2.10 Drying 4.2.11 Evaporation, 4.2.12Crystallization, 4.2.13 Absorption 4.2.14 Adsorption	**10**	**12**	**CO4**
5	**Unit Process** 5.1 Unit Process: Definition and applications 5.2 Unit Process 5.2.1 Oxidation, 5.2.2 Reduction 5.2.3 Sulphonation 5.2.4 Nitration 5.2.5 Dehydrogenation 5.2.6 Pyrolysis 5.2.7 Calcination, 5.2.8 Hydrogenation, 5.2.9 Hydration 5.2.10 Dehydration, 5.2.11Esterification	**10**	**12**	**CO4**
6	**Basic Concepts of Chemical Processes** 6.1Definition of Conversion, 6.2yield, 6.3reaction efficiency 6.4Flow sheets, block diagrams	**08**	**08**	**CO5**
	TOTAL	**64**	**70**	

7.SUGGESTED PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term work consists of Journal containing minimum no of 10 experiments

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approx.Hrs required	CO No.
1.	Visit chemical laboratory, list of chemicals available and write report on its specification	02	CO1
2.	Visit chemical laboratory, identify hazards and write a report on safety provisions	02	CO2
3.	Demonstrate the use of personal protective equipments.	02	CO2
4.	Prepare the solution of given Normality	02	CO3
5.	Prepare the solution of given Molarity	02	CO3
6.	Prepare the solution of given Molality	02	CO3
7.	Measure the dry bulb and wet bulb temperature using Sling psychrometer	02	CO3
8.	Determine the composition of solution by measuring specific gravity.	02	CO3
9.	Prepare the solution of given pH.	02	CO4
10.	Determine the electrical conductivity of salt solutions of the given concentration.	02	CO4
11.	Prepare the saturated solution of the given salt (e.g. KCl)	02	CO4
12.	Determine the moisture content in the given solid sample	02	CO5
13.	Use magnetic separator to separation mixture of sawdust and iron fillings	02	CO5
14.	Industrial Visit	06	CO5

8.IMPLEMENTATION STRATEGY(PLANNING)

1.Teaching Plan/Tutorials
2. Minimum no of 10 practicals.

9. SUGGESTED LEARNING RESOURSES

S. No.	Title of Book	Author	Publication
1	Unit Operations of Chemical Engineering	McCabe, W. L. Smith, Harriott	McGraw Hill International; 2010; ISBN: 007-124710-6
2	Introduction to Chemical Engineering	Ghosal S. K., SanyalShyamal K., Datta S.	Tata McGraw Hill Publications; 2006; ISBN: 0-07-460140-7
3	Unit Operations of Chemical Engineering	Walter L. Badger, Julius T. Banchero	McGraw Hill International, 1955; ISBN: 9780070850279
4	Stoichiometry	Bhatt B. I., Vora S. M.	Tata McGraw Hill Publications New Delhi; 1984; ISBN: 9780070964044

5	Mechanical Operations	Swain Anup K., PatraHemlata, Roy G. K.	McGraw Hill Publication; 2010; ISBN: 0070700222
6	Fundamentals of Chemical Engineering	S.N. Saha	DhanpatRai Publishing Company New Delhi, 2012, ISBN:81-87433-55-8

10. WEB REFERENCES

1. https://www.eit.edu.au/cms/resources/books/practical-fundamentals-of-chemical-engineering
2. https://www.aiche.org/topics/chemical-engineering-practice/fundamentals-chemical-engineering-theory
3. http://www.idc-online.com/control/Chemical_Engineering_Fundamentals.pdf
4. www.iisc.ernet.in
5. www.thechemicalengineer.com
6. www.ichemeblog.org/

11.SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Chemistry and Chemical Engineering	08	02	02	04	08
II	Basic chemical calculations	12	04	04	06	14
III	Properties of Solution	16	04	04	08	16
IV	Unit Operation	10	02	04	06	12
V	Unit Process	10	02	04	06	12
VI	Basic Concepts of Chemical Processes	08	02	02	04	08
	Total	64	16	20	34	70

R Remembering, U Understanding, A Applying, AN Analyzing, E Evaluating, C Creating (Bloom's revised taxonomy levels)

12.COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Jyoti S Sangale	
2	Internal	Nilesh R Nagose	
3	Internal	R.D.Shimpi	
4	External	R. C. Nazkhede Organization: Datta Meghe College of Engg, Airoli	

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC MUMBAI 400056.

1. COURSE DETAILS

Programme: CE/ME/EE/PE/CH	**Semester:II/II/IV/III/II**
Course: Stress Management	**Group:M**
Course Code: STM190012	**Duration:16 Weeks**

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum							
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	-----	-----	-----	-----	-----	-----	-----	-----	022

3. COURSE OBJECTIVE

Students will be able to

1. Gain knowledge about the basic technique and practice of yoga, including instruction in Breath control, meditation, and physical postures.

2. Develop physical competency and mental concentration.

3. Gain an intellectual and theoretical understanding of the principles embodied in the Yoga Sutras,

4. Increase efficiency, concentration, inner power and enhance the spiritual power for improving Learning Skill

4. SKILL COMPETENCY :

The aim of the course is to develop the various basic skills required for individuals to identify and manage various stresses in their academic and personal life.

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

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Understand the basic methods to manage the stress.	Understanding
CO2	Understand the social ethics	Understanding
CO3	Develop the positive attitude towards society	Applying
CO4	Reduce psychological, mental and emotional stress	Applying

6. **COURSE CONTENTS**

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	. HISTORICAL BACKGROUND AND YOGA LEARNING i) Yoga in Vedas ii) Yoga and its Principles iii) Consciousness iv) Yoga approach and Scientific view v) Pranayama: Breath Control, Breath and Postures, Rhythmic Breathing vi) Controlling the Body, Mechanism of Body: Kriyas and its high Therapeutic value. vii) Body as understood in its frame work systems and structure:.Asanas Cultural and Relaxation Asanas - viii) Muscles strength, Muscular coordination strength of Immune system ix) Relation and Reflection techniques Shavasana Shakshi Bhavanam. x)Bandhas and Mudras. xi) Depth of perception and expansion of awareness xii) Gross level Muscular stretches xiii) Subtle level Respiration changes and normalizing breath.	10	---	CO1 CO2
2	MEDITATION AND ITS TECHNIQUES: Meditative postures and kinds of Meditation Bodily Benefits Lower Blood Pressure ,lowers the levels of blood lactate, improves the immune system, increases body vitality, controls insomnia and increases overall health of the body Violence Free Society Meditation develops happiness, contentment and calmness. When increasing number of people practice meditation, it has a calming effect on the environment. This is a potent way to achieve a violence free society. Mental Benefits Emotional stability, anxiety decreases, anger reduces, happiness increases, and intuition develops clarity and peace of mind, induces ability to focus, and reduces tension and fear. Value Based Society	10	---	CO3

3	ART OF LIVING 1. Sudarshan Kriya 2. Life Skills 3. Ancient Wisdom 4. Practical knowledge to deal with the daily challenges of life 5. Interactive exercises 6. Dealing with your emotions 7. Improving Communication skills and Relationship	08	----	CO3
4	STRESS MANAGEMENT FOR STUDENTS Stress management techniques: 1. Time management techniques 2. Organization techniques 3. Create a study environment 4. Memorization techniques 5. Be an Optimist 6. Sleep Well 7. Study Techniq	04	----	CO4
	TOTAL	32	----	----

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

This is purely practice based subject where students will be doing exercises of asana and pranayama and dhyan under the guidance of external and internal experts

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approx.Hrs required	COs
1	HISTORICAL BACKGROUND AND YOGA LEARNING	04	CO1
2	MEDITATION AND ITS TECHNIQUES	08	CO3
3	ART OF LIVING	04	CO3
4	STRESS MANAGEMENT FOR STUDENTS	08	CO4

8. IMPLEMENTATION STRATEGY (PLANNING)

1. The students will be performing practice sessions covering above topics.
2. Live demonstration along with content delivery sessions will be conducted.
3. The lecture room/ Hall separately will be assigned batchwise as per Time Table for Male (Boys) and Female(Girls) as where an applicable depending upon relevant topics.
4. The materials/ Items required example Yoga Matt/ Chatai/corresponding matt / towels / chadar are to be brought by students only for particular topics.

9. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	The Yoga Sutra of Patanjali	M.R.Yardi, Bhandarkar	-
2	Indian Philosophy	Dr. S. Radhakrishanan	-
3	Introduction to Indian Philosophy	Dutta & Hiriyanna Chatterji	-
4	Outlines of Indian Philosophy	Hiriyanna.	-

10. WEB REFERENCES

1. http://www.artofliving.org
2. http://www.bkwsu.org
3. http://www.theyogainstitute.org
4. http://www.managingstress.com
5. http://3srb.org

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	**N.M.Pathak**	
2	Internal	R.D. Shirsagar	
3	Internal	S.A. Kamble	
4	External	**Chirag Kachaliya** M/s Mihir Idustries pvt ltd	

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