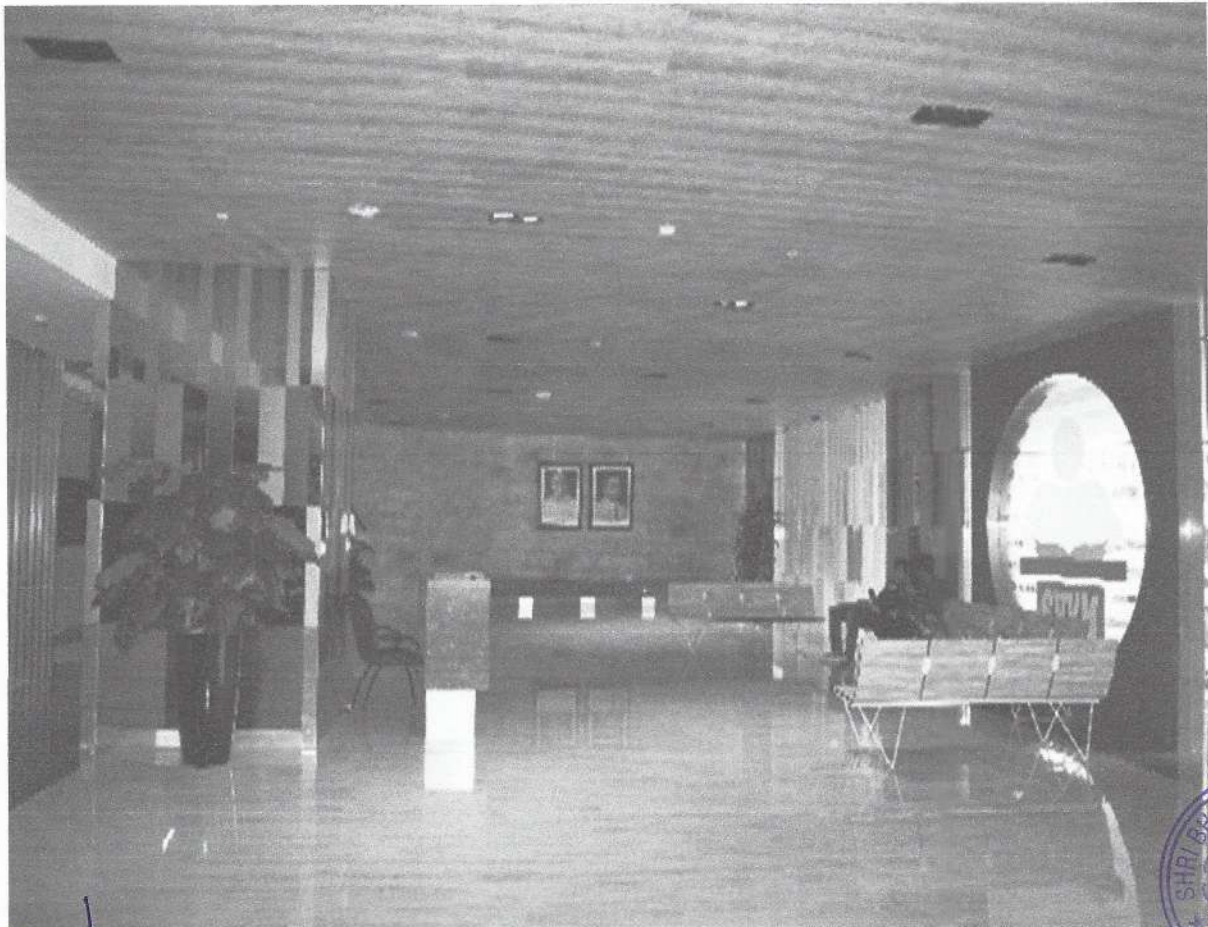




Shri Vile Parle Kelavani Mandal's  
**SHRI BHAGUBHAI MAFATLAL POLYTECHNIC**  
Vile Parle (West), Mumbai-400 056



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



Head,  
**PLASTICS ENGINEERING DEPARTMENT,**  
Shri Bhagubhai Mafatlal Polytechnic,  
BOMBAY-400 056.

Approved Copy  
  
**Curriculum Co-Ordinator / COE**

  
**PRINCIPAL**  
**SHRI BHAGUBHAI MAFATLAL POLYTECHNIC**  
**VILE PARLE (WEST), MUMBAI-400 056**





Shri Vile Parle Kelavani Mandal's  
**SHRI BHAGUBHAI MAFATLAL POLYTECHNIC**

Natakkar Ram Ganesh Gadkari Marg,

Vile Parle (West), Mumbai-400 056

Tel: 022- 4233 6000

Fax: (022) -2611 0117

Email: principalsbmp@rediffmail.com

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

**CURRICULUM**

**THREE YEARS FULL TIME DIPLOMA COURSE  
WITH INPLANT TRAINING  
IN  
PLASTIC ENGINEERING  
(Semester Pattern)**



*[Handwritten signature]*

Head,  
PLASTICS ENGINEERING DEPARTMENT,

Shri Bhagubhai Mafatlal Polytechnic

BOMBAY-400 056

Approved Copy

*[Handwritten signature]*  
Curriculum Co-ordinator / COE

*[Handwritten signature]*  
PRINCIPAL

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC  
VILE PARLE (WEST), MUMBAI-400 056

Shri Vile parle Kelvani Mandal's  
**SHRI BHAGUBHAI MAFATLAL POYTECHNIC**  
NATAKKAR RAM GANESH GADKARI MARG  
VILEPARLE WEST MUMBAI-400056

**CURRICULUM**

Shri Bhagubhai Mafatlal Polytechnic started 3 year's Diploma course and affiliated to the Board of Technical Examinations, Maharashtra State, in 1963. Since 1969, academic freedom was granted to the Polytechnic, which enable it to evolve curriculum and examination scheme and to introduce inplant training, resulting into industry institute interaction. Thus 4 year's semester sandwich pattern came in existence. Since 1978-79 academic freedom was extended to all the full-time diploma courses. In 1989-90, full autonomy was granted to all seven full-time Diploma Programmes. As further development to the above, the Multi-Point Entry and Credit System (MPE&CS) was initiated in 1981 on the progressive basis. In the scheme students can regulate their pace of studies Within rules prescribed. From 1993-94, full academic autonomy was extended to the all courses.

**(Full Time 3 year with Inplant Training)**

**Diploma programme in PLASTIC ENGINEERING**

The Programme is designed to full fill the needs of Plastic Industry. The emphasis of the Course is on polymer education, deals with plastic raw materials, manufacturing, processing, testing, fabrication, product design, Auto CAD & mould design, plastic moulding machines & their construction, working, maintenance and servicing. Also basics and advanced hydraulics, pneumatics and system controls. The Student will also learn basics of Computer, CAD, CAM etc.

**PRACTICAL TRAINING:**

The students receive institutional training for the first four semesters. In the 5<sup>th</sup> semester they are given inplant/field training.

In the concluding 6<sup>th</sup> semester, they again receive institutional training. This scheme enables the students to expose to industry during the training, which provide for practice orientation and improves their prospects for employment.



## **Vision and Mission of Plastic Engineering Department:**

### **Vision:-**

To Empower the students through knowledge to produce high quality Professionals and Entrepreneur.

### **Mission:-**

- To provide abundant knowledge through strong Industry-Institute interaction.
- To continuously improve the teaching-learning process through need based curriculum and infrastructure.
- To create competent professionals and Entrepreneurs, contributing towards sustainable growth of plastics and allied engineering.
- To inculcate environmental awareness, soft skills and promote lifelong learning.



**PEOs (Programme Educational Objectives):-**

- PEO-1- Our student will demonstrate the ability to occupy key position in the industry in the areas of Engineering and design.
- PEO-2- Our student will demonstrate ability to continue professional development through higher education.
- PEO-3- Our student will demonstrate the entrepreneurship abilities.
- PEO-4- Our student will communicate and work effectively with others having different role or responsibilities .
- PEO-5- Our student will demonstrate sensitivity in practicing the profession in an ethical values and society.



**Programme Outcomes (POs)** At the end of programme, a student will be able to

- PO1- Apply knowledge of basic mathematics, science and engineering to solve engineering problems.
- PO2 - Apply knowledge of plastic processing, plastics product design, polymer science and plastic testing, mould design to solve plastic engineering and applied engineering problems.
- PO3- Plan and perform experiments and practices and use these results to solve engineering problems.
- PO4- Apply plastic technology and its tools with an understanding of the limitations.
- PO5- Demonstrate knowledge to assess social, health, safety, legal and cultural issues and consequent responsibilities relevant to plastic engineering practice.
- PO6- Understand the impact of the engineering solutions in social and environmental contexts and demonstrate the knowledge and need for sustainable development.
- PO7- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO8- Function effectively as an individual and as member or leader in diverse/ multidisciplinary team.
- PO9- Communicate effectively.
- PO10- Recognise need for plastics engineering and have the preparation and ability to engage in independent and lifelong learning in the context of technological changes.

**Programme Specific Outcomes:-**

- PSO1:- Pass out student will work as an Engineer in Plastic product design, mould design, Plastics Processing Plants, plastics testing, polymer Manufacturing industries and related Industries.
- PSO2 - Pass out student will be able to setup Plastics industry as an Entrepreneur.



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

**PROGRAMME: PLASTIC ENGINEERING**  
**SEMESTER: I**

With effect from batch admitted June, 2019(Progressively)  
Duration:16 Weeks

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks							Gr	Scheme L/P/Cr	
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	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 (PE) (WSP190522)	-	4	-	-	4	-	-	-	-	-	50	-	-	50	C*	044	
<b>TOTAL</b>		17	8	4	4	33	No. of Papers=4		80	40	280	275	100	-	775		17/16/33	
<b>TOTAL PERIODS = 33</b>										<b>TOTAL MARKS = 775</b>								

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

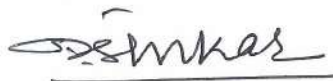
**PROGRAMME: PLASTIC ENGINEERING**  
**SEMESTER: II**

With effect from batch admitted June, 2019(Progressively)  
 Duration:16 Weeks

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks							Gr	Scheme L/P/Cr	
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL			
2.1	Engineering Mathematics (EMT190009)	3	-	-	2	5	03	70	20	10	70	25	-	-	125	B*	325	
2.2	Applied Physics (APH 190010)	4	2	-	-	6	01	@70	20	10	70	25	50	-	175	B*	426	
2.3	Development of life Skills (DLS 190004)	2	-	-	1	3	-	-	-	-	-	50	-	50	100	B*	213	
2.4	Organic & 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	3	70	20	10	70	25	-	25	150	B*	426	
2.6	Material Science (MTS 190501)	3	-	-	-	3	03	70	20	10	70	-	-	-	100	C*	303	
2.7	Machine Drawing & AutoCAD (MDA 190502)	2	2	2	-	6	-	-	-	-	-	50	50	-	100	C*	246	
<b>TOTAL</b>		<b>21</b>	<b>08</b>	<b>2</b>	<b>3</b>	<b>34</b>	<b>No.of Papers=5</b>		<b>100</b>	<b>50</b>	<b>350</b>	<b>200</b>	<b>150</b>	<b>75</b>	<b>925</b>		<b>21/13/34</b>	
<b>TOTAL PERIODS = 34</b>										<b>TOTAL MARKS = 925</b>								

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



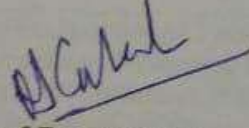
**Shri Vile Parle Kelavani Mandal's**  
**SHRI BHAGUBHAI MAFATLAL POLYTECHNIC**  
**TEACHING AND EXAMINATION SCHEME**

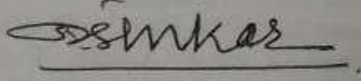
PROGRAMME: PLASTIC ENGINEERING  
SEMESTER: III

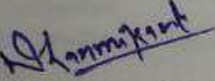
With effect from batch admitted June, 2019(Progressively)  
Duration:16 Weeks

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks								Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL			
3.1	Applied Mathematics (AMT 190013)	3	-	-	1	4	3	70	20	10	70	25	-	-	125	C*	314	
3.2	Technology Of Plastics (TOP 190503)	3	2	-	-	5	3	70	20	10	70	25	50	-	175	C*	325	
3.3	Plastics Molding Techniques (PMT 190504)	3	2	-	-	5	3	70	20	10	70	25	-	25	150	A*	325	
3.4	Plastics Processing Machines (PPM 190505)	3	2	-	-	5	3	70	20	10	70	25	-	25	150	C*	325	
3.5	Polymer Science (PLS 190506)	3	2	-	-	5	03	70	20	10	70	25	50	-	175	C*	325	
3.6	Strength of Materials (SOM 190015)	4	2	-	-	6	3	70	20	10	70	50	-	-	150	C	426	
3.7	Stress Management (STM 190012)	-	2	-	-	2	-	-	-	-	-	-	-	-	-	M	022	
<b>TOTAL</b>		<b>19</b>	<b>12</b>		<b>1</b>	<b>32</b>	<b>No.of Papers=6</b>		<b>120</b>	<b>60</b>	<b>420</b>	<b>175</b>	<b>100</b>	<b>50</b>	<b>925</b>		<b>19/13/32</b>	
<b>TOTAL PERIODS = 32</b>										<b>TOTAL MARKS = 925</b>								

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

**PROGRAMME: PLASTIC ENGINEERING**  
**SEMESTER: IV**

With effect from batch admitted June, 2019(Progressively)  
**Duration:16 Weeks**

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
4.1	Basic of Mould Design (BMD 190507)	2	2	2	-	6	4	70	20	10	70	50	-	25	175	A*	246
4.2	#Hydraulic, Pneumatics & System Control (HPS 190508)	3	2	-	-	5	3	70	20	10	70	50	-	50	200	A*	325
4.3	#Polymer Composites, Blends & Alloys (PCB190509)	3	2	-	-	5	3	70	20	10	70	50	-	50	200	A*	325
4.4	#Plastics Testing & Product Design (PTP 190510)	4	2	-	-	6	3	70	20	10	70	50	50	-	200	A*	426
4.5	Elective -I (Any one)																
4.5	Plastics In Packaging .1 (PIP 190511)	3	2	-	-	5	3	70	20	10	70	25	25	-	150	A*	325
4.5	CAD,CAM & CIM .2 (CCC 190512)	3	2	-	-	5	3	70	20	10	70	25	25	-	150	A*	325
4.6	Metrology & Quality Control (MQC 190513)	3	2	-	-	5	3	70	20	10	70	25	50	-	175	A	325
4.7	Elastomer Technology (ELT 190514)	3	2	-	-	5	3	70	20	10	70	25	-	50	175	A	325
	<b>TOTAL</b>	<b>21</b>	<b>14</b>	<b>2</b>		<b>37</b>	<b>No.of Papers=7</b>		<b>140</b>	<b>70</b>	<b>490</b>	<b>275</b>	<b>125</b>	<b>175</b>	<b>1275</b>		<b>21/16/37</b>
		<b>TOTAL PERIODS = 37</b>					<b>TOTAL MARKS = 1275</b>										

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**



  
**Principal**

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

**PROGRAMME:** Plastic Engineering  
**SEMESTER:** V

With effect from batch admitted June, 2019 (Progressively)

**#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 190523)	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

Head of Department



Controller of Examination



Secretary CDC



Principal




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

**PROGRAMME: PLASTIC ENGINEERING**  
**SEMESTER: VI**

With effect from batch Admitted June, 2019(Progressively)  
 Duration:16 Weeks

Sr. No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
6.1	#Design of Molds & Dies (DMD 190515)	2	2	2	-	6	4	70	20	10	70	50	50	-	200	A*	246
6.2	#Processing of Plastics (POP 190516)	3	2	-	-	5	3	70	20	10	70	25	50	--	175	A*	325
6.3	#Plastics Plant Equipments (PPE (190517)	3	2	-	-	5	3	70	20	10	70	25	50		175	A*	325
6.4	#Project (PRO 190518)	-	6	-	-	6			-			50		50	100	A*	066
6.5	#Elective -II (Any one)																
6.5.1	Production Management (PRM 190519)	2	2			4	3	70	20	10	70	50			150	M*	224
6.5.2	Entrepreneurship Development (EDP 190018)	2	2	-		4	3	70	20	10	70	50	-		150	M*	224
6.6	Plastics Waste Management (PWM 190520)	3	2	-		5	3	70	20	10	70	25		25	150	M	325
6.7	Fabrication of Mold And Dies (FMD 190521)	3	2	-	-	5	3	70	20	10	70	25	-	25	150	A	325
	<b>TOTAL</b>	<b>16</b>	<b>18</b>	<b>2</b>		<b>36</b>	<b>No.of Papers=6</b>		<b>120</b>	<b>60</b>	<b>420</b>	<b>250</b>	<b>150</b>	<b>100</b>	<b>1100</b>		<b>16/20/36</b>
<b>TOTAL PERIODS = 36</b>						<b>TOTAL MARKS = 1100</b>											

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 Vile Parle Kelavani Mandal's**  
**SHRI BHAGUBHAI MAFATLAL POLYTECHNIC**  
**TEACHING AND EXAMINATION SCHEME**  
**LIST OF AWARD WINNING COURSES**

**PROGRAMME: Plastic engineering**

**with effect from batch admitted June, 2019(Progressively)**

Sr · No.	Course Name (Code)	Scheme of Instructions and Periods per week					Theory Paper Duration and Marks(ESE)		Examination Scheme and Maximum Marks							Gr	Scheme L/P/Cr
		L	P	D	T	Cr (L+P+D+T)	Hrs	Mks	SSL	TA	TH	TW	PR	OR	TOTAL		
1	HYDRAULIC, PNEUMATICS & SYSTEM CONTROL –(HPS 190508)	03	02	-	-	05	03	70	20	10	70	50	-	50	200	A*	325
2	POLYMER COMPOSITE, BLENDS AND ALLOYS –(PCB190509)	03	02	-	-	05	03	70	20	10	70	50	-	50	200	A*	325
3	PLASTICS TESTING AND PRODUCT DESIGN –(PTP190510)	04	02	-	-	06	03	70	20	10	70	50	50	-	200	A*	426
4	DESIGN OF MOLDS AND DIES (DMD 190515)	02	02	02	-	06	04	70	20	10	70	50	50	-	200	A*	246
5	PROCESSING OF PLASTICS (POP 190516)	03	02	-	-	05	03	70	20	10	70	25	50	-	175	A*	325
6	PLASTICS PLANT EQUIPMENTS (PPE 190517)	03	02	-	-	05	03	70	20	10	70	25	50	-	175	A*	325
7	PROJECT –(PRO 190518)	-	06	-	-	06	-	-	-	-	-	50	-	50	100	A*	066
8	ELECTIVE –II (ANYONE) PRODUCTION MANAGEMENT ENTREPRENEURSHIP DEVELOPMENT	02	02	-	-	04	03	70	20	10	70	50	-	-	150	M*	224
9	INPLANT TRAINING ( IPT 190523)					20						50	-	50	100	A*	-/-/20
<b>TOTAL</b>		<b>20</b>	<b>20</b>	<b>02</b>	<b>-</b>	<b>42</b>	<b>No.of Papers=7</b>		<b>140</b>	<b>70</b>	<b>490</b>	<b>400</b>	<b>200</b>	<b>200</b>	<b>1500</b>		<b>20/22/62</b>
		<b>TOTAL PERIODS = 42</b>					<b>TOTAL MARKS 1400+100(INPLANT)=1500</b>										

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**



## Credit Summary for 2019 Scheme

**Programme: Plastic 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	-	14	-	19	06	-	-	-	-	-	-	55
A	-	-	-	-	05	-	27	10	20	-	22	5	89
M	-	-	-	-	-	02	-	-	-	-	04	05	11
<b>Total</b>	<b>33</b>	<b>-</b>	<b>34</b>	<b>-</b>	<b>24</b>	<b>08</b>	<b>27</b>	<b>10</b>	<b>20</b>	<b>-</b>	<b>26</b>	<b>10</b>	<b>172+20=192</b>

C\*-Compulsory O-Optional, Gr -Group, B - Basic, C - Core, A - Application, M - Management

*[Signature]*  
Head of Department

*[Signature]*  
Controller of Examination

*[Signature]*  
Secretary CDC

*[Signature]*  
Principal



**Shri Vile Parle Kelavani Mandal's**  
**SHRI BHAGUBHAI MAFATLAL POLYTECHNIC**  
**Vile Parle (W) Mumbai-400056**

**Programme: Plastic Engineering**

**With effect from June 2019**

**Credit Summary**

<b>Group</b>	<b>Max. Credit</b>	<b>Compulsory Credit</b>	<b>Optional Credit</b>	<b>Remark</b>
B = Basic	37	37	-	
C = Core	55	49	06	
A= Application	69	54	15	
M = Management	11	04	07	
<b>Total</b>	<b>172</b>	<b>144</b>	<b>28</b>	

**Compulsory** : 144  
**Optional Credit** : 28  
**Inplant Training Credit** : 20  
**TOTAL CREDIT** : 192



## RATIO OF THEORY : PRACTICAL

Total Theory Crédits Offered	Total Practical Credits Offered	Theory : Practical
94	(78+20)98	49:51
Total Theory Credits ( Award Winning)	Total Practical Credits (Award Winning)	
20	(22+20)42	32 :68
Total TH/SSL Exam Marks for Offered Courses	Total TA/TW/PR/OR Exam Marks for Offered Courses	
2520	2580	49 :51
Total TH/SSL Exam Marks for Award Winning Courses	Total TA/TW/PR/OR Exam Marks for Award Winning Courses	
630	870	42 :58

Semester	Total Credits/Marks offered				Award winning Credits/Marks			
	Theory credits	Marks	Practical credits	Marks	Theory credits	Marks	Practical credits	Marks
Semester I	17	360	16	415	-	-	-	-
Semester II	21	450	13	500	-	-	-	-
Semester III	19	540	13	360	-	-	-	-
Semester IV	21	630	16	645	10	270	06	330
Semester V			20	100			20	100
Semester VI	16	540	20	560	10	360	16	440
<b>Total</b>	<b>94</b>	<b>2520</b>	<b>98</b>	<b>2580</b>	<b>20</b>	<b>630</b>	<b>42</b>	<b>870</b>

*[Signature]*

Head of Department

*[Signature]*

Controller of Examination

*[Signature]*

Secretary CDC

*[Signature]*  
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	<b>Logarithm</b> 1.1 Concept 1.2 Basic Laws of logarithm (without proof) 1.3 Numerical on Change of Base (without proof)	03	04	CO1
2	<b>Partial Fraction</b> 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	<b>Straight Lines</b> 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	<b>Trigonometry</b> 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	<b>Determinants &amp; Matrices</b> 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	<b>Function</b> 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	<b>Limits</b> 7.1 Introduction and Definition 7.2 Concepts of limits 7.3 Limits of algebraic, trigonometric, exponential and logarithmic functions	08	10	CO 4
<b>Total</b>		<b>48</b>	<b>70</b>	

## 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	2

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](http://www.mic-mathematics.com)
2. [www.math.com](http://www.math.com)
3. [www.lernerstv.com](http://www.lernerstv.com)
4. [www.onlinetutorials.com](http://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
<b>TOTAL</b>		<b>18</b>	<b>35</b>	<b>17</b>	<b>70</b>

**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	<i>[Handwritten Signature]</i>
2	Internal	Mr.R.R.Ambade	<i>[Handwritten Signature]</i>
3	Internal	Mr.U.J.Patel	<i>[Handwritten Signature]</i>
4	External	Ms.Meena Gawas Organisation: Mithibai College Of Arts and Science	<i>[Handwritten Signature]</i>



## 1. COURSE DETAILS

Programme: CE/ME/EE/IE/PE/CHE/DE  
Course: Applied Chemistry  
Course Code: ACH190002

Semester: I/II  
Group: B\*  
Duration: 16 Weeks

## 2. TEACHING AND EXAMINATION SCHEME

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

## 3. COURSE OBJECTIVE

The course of applied chemistry is designed considering two aspects

- Basic principles of Chemistry
- Chemistry of materials

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

## 4. SKILL COMPETENCY

Following Skills and competency will be developed

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



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

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

**6. COURSE CONTENTS**

Sr. No.	TOPIC/ Sub-Topics	Hours	Marks	COs
1	<b>1. Atomic Structure</b> 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 <sub>2</sub> , MgO, AlCl <sub>3</sub> , CO <sub>2</sub> , H <sub>2</sub> O, Cl <sub>2</sub> , NH <sub>3</sub> , C <sub>2</sub> H <sub>4</sub> , N <sub>2</sub> , C <sub>2</sub> H <sub>2</sub>	12	15	CO1
2	<b>2. Electrochemistry</b> 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	<b>3. Metals &amp; Alloys Metals</b> 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	<b>4. Water and pH:</b> 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	<b>5. Corrosion and Protective Coatings:</b> <b>Corrosion:</b> 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	<b>6. Lubricants:</b> 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	<b>7. Non-Metallic Engineering Materials</b> 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
	<b>TOTAL</b>	<b>64</b>	<b>70</b>	

## 7. LIST OF PRACTICALS

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

Sr. No.	Title of Experiment	Approx.Hrs required	COs
01 to 03	Techniques of determination of concentration of solutions: <u>Volumetric Analysis</u> a) Neutralization Titration i) Titration between Strong Acid and Strong Base using Phenolphthalein as indicator – 2 sets b) Redox Titration i) Titration between $\text{KMnO}_4$ and $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	10	CO4 CO5
04 to 05	Determination of: a) Hardness of water using EDTA b) Chloride content in water	04	CO5
06	Determination of pH of different solutions.	02	CO5
07 to 08	<u>Qualitative Analysis of Two Solutions</u> containing One Basic and One Acidic Radical listed below: a) <b>Basic Radicals:</b> $\text{Pb}^{+2}$ , $\text{Cu}^{+2}$ , $\text{Al}^{+3}$ , $\text{Fe}^{+2}$ , $\text{Fe}^{+3}$ , $\text{Ca}^{+2}$ , $\text{Ba}^{+2}$ , $\text{Mg}^{+2}$ , $\text{K}^+$ , $\text{Na}^+$ . b) <b>Acidic Radicals:</b> $\text{Cl}^-$ , $\text{SO}_4^{-2}$ , $\text{CO}_3^{-2}$ , $\text{NO}_3^-$ .	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
	<b>TOTAL</b>	<b>32</b>	

## 8.IMPLEMENTATION STRATEGY(PLANNING)

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



## 9. LEARNING RESOURCES

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

## 10. WEB REFERENCES

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

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

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

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

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

## 12. COURSE EXPERT COMMITTEE MEMBERS

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



## 1. COURSE DETAILS

<b>Programme:</b> CE/ME/EE/IE/PE/CHE/DE	<b>Semester:</b> I
<b>Course:</b> Environmental Studies	<b>Group :</b> B*
<b>Course Code:</b> EVS190003	<b>Duration :</b> 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	<b>1. The Multidisciplinary nature of environmental studies:</b> 1.1 Definition, scope and importance 1.2 Need for public awareness	03	--	CO5
2	<b>2. Natural Resources: Renewable and non-renewable resources:</b> 2.1 Natural resources and associated problems <b>2.2 Forest resources:</b> Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forest and tribal people. <b>2.3 Water resources:</b> Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams' benefits and problems. <b>2.4 Mineral resources:</b> Use and exploitation, environmental effects of extracting and using mineral resources. <b>2.5 Food resources:</b> World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. <b>2.6 Land resources:</b> Land as a resource, land degradation, man induced landslides, soil erosion and desertification. <b>2.7 Energy resources:</b> <b>2.7.1 Renewable Energy Resources</b> – Biogas, Solar energy, Wind energy, Energy from falling water, Energy from wastes and tidal energy. <b>2.7.2 Non-Renewable Energy Resources</b> – 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	<b>3. Eco Systems:</b> 3.1 Concept of ecosystem 3.2 Major ecosystems in the world	03	--	CO2
4	<b>4. Biodiversity and Its Conservation</b> 4.1 Concepts 4.2 Threats to biodiversity 4.3 Value and conservation of biodiversity	02	--	CO3
5	<b>5. Environmental Pollution</b> 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	<b>6. Social issues and the Environment</b> 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	<b>7. Environmental Protection</b> 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
<b>TOTAL</b>		<b>32</b>		

## 7. LIST OF ASSIGNMENTS

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

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

## 8. IMPLEMENTATION STRATEGY (PLANNING)

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



## 9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Text book of Environmental studies	Erach Bharucha	UGC Press
2.	Environmental studies	Rajagopalan	Oxford University Press
3	Environmental studies	Anandita Basak	Dring 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](http://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. Anni Organaisation: Mucchala Polytechnic Thane	



## 1. COURSE DETAILS: Communication Skills

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

## 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	<b>COMMUNICATION</b> 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	<b>Application of Grammar</b> 2.1 Tense & its sub types 2.2 Degree and Its types 2.3 Change the voice	04	06	CO 2
3	<b>Vocabulary Building</b> 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	<b>Language lab and Spoken English</b> 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	<b>Nonverbal Communication</b> 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	<b>Barriers to communication</b> 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	<b>Paragraph writing</b> 7.1 Types of paragraph writing Inductive and Deductive method 7.2 Development of Paragraph	05	06	CO 4
8	<b>Notice and circular</b> 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	<b>Letter writing</b> 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	<b>Reading comprehension</b> 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
	<b>Total</b>		<b>16</b>



## 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
<b>TOTAL</b>		<b>11</b>	<b>22</b>	<b>37</b>	<b>70</b>

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

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

### 12 COURSE EXPERT COMMITTEE MEMBERS

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



## 1. COURSE DETAILS

<b>Program:</b> CE/ME/PL/CH	<b>Semester:</b> I
<b>Course:</b> Applied Mechanics	<b>Group:</b> C*
<b>Course Code:</b> APM190005	<b>Duration:</b> 16 Weeks

## 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 (ESE)		SSL	TA	TH	TW	PR	OR	Total
L	P	D	T		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 stationary bodies, 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	<b>1. Introduction and fundamentals of force system:</b> 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	<b>2. Resolution and Composition of forces:</b> 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	<b>3. Equilibrium</b> 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. 3.4 Analytical conditions of equilibrium for coplanar concurrent & Non-concurrent Forces.	7	10	CO2, CO3
4	<b>4. Beam Reactions</b> 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	<p><b>5. Friction:</b></p> <p>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.</p> <p>5.2 Equilibrium of bodies on level plane –external force applied horizontal and inclined up and down.</p> <p>5.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane,</p> <p>5.4 Ladder Friction</p>	7	10	CO4
6	<p><b>6. Centroid and Centre of Gravity:</b></p> <p>6.1 Definition of Centre of gravity of solids and centroid of plane laminae</p> <p>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.</p> <p>(Applications like floating bodies, dams &amp; retaining wall sections, beams, columns sections (rolled steel), simple and built up sections)</p>	7	10	CO4
7	<p><b>7. Graphics Statics</b></p> <p>7.1 Space diagram, Bows notation.</p> <p>7.2 Law of Triangle of forces, Polygon of forces, Force/ Vector diagram</p> <p>7.3 Resultant and equilibrium of concurrent forces</p> <p>7.4 Polar diagram, Funicular polygon</p> <p>7.5 Resultant and equilibrium of non-concurrent and nonparallel forces</p> <p>(Applications in finding reactions of beams)</p>	5	7	CO3



8	<b>8. Simple Lifting Machine:</b> 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
<b>TOTAL</b>		<b>48</b>	<b>70</b>	

### 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 RESOURCES

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

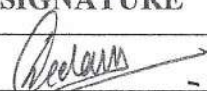

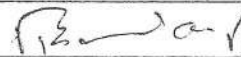
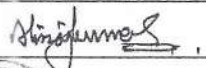
## 11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

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
	<b>TOTAL</b>	<b>16</b>	<b>16</b>	<b>38</b>	<b>70</b>

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	<b>Drawing Instruments and their uses</b> 1.1. Introduction: Importance of Engineering Drawing 1.2. Study the use of Drawing instruments, types of lines and Dimensioning techniques used in Engineering Drawings. 1.3. Study the use of different Scales in Engineering Drawings: Reduce Scale, Enlarge Scale and Full Size Scale 1.4. Geometrical constructions: To draw a perpendicular bisector of a given line. To divide the line into number of equal parts To draw line parallel to one another To Divide the given circle into number of equal parts To draw regular polygon of given side	02	---	CO2
2	<b>Engineering curves</b> 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	<b>Orthographic projections</b> 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	<b>Isometric view and projection</b> 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	<b>Projection of planes</b> 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	<b>Projections of solids</b> 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	<b>Free hand sketches</b> <b>Thread Profiles and Screw Fasteners.</b> 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
<b>TOTAL</b>		<b>32</b>	<b>50</b>	

## 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. Home Assignments: Four problems in sketchbook	04	CO2
03	One sheet with four problems on non-sectional orthographic views for the objects with curvilinear features Home Assignments: Four problems in sketchbook	12	CO1
04	One sheet with four problems on Sectional orthographic projections with full and half section. Home Assignments: Four problems in sketchbook	14	CO1
05	One sheet with four problems on Isometric views and projections. Home Assignments: Four problems in sketchbook	10	CO1
06	One sheet with four problems on projections of planes. Home Assignment: Four problems in sketchbook.	06	CO3
07	One sheet with four problems on projections of solids. Home Assignment: Four problems in sketchbook.	08	CO3
08	One sheet on free hand sketches of Thread Profiles and Screw Fasteners Home assignments: Free hand sketches in sketchbook	06	CO4



## 8. IMPLEMENTATION STRATEGY (PLANNING)

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

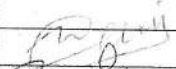
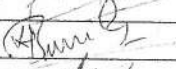
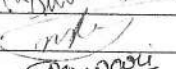
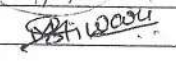
## 9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Engineering drawing	R.K. Dhawan	S.Chand & Co.Ltd., Ram Nagar New Delhi-110 055. ISBN-13: 9788121914314 ISBN-10: 8121914310
2.	Engineering drawing	N.H. Dubey	Nandu Prakashan
3.	Engineering Drawing Practice for Schools and Colleges IS: SP-46	Bureau of Indian Standards.	BIS, Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2
4.	Engineering Drawing	Bhatt, N.D.	Charotar Publishing House, Anand, Gujarat 2010; ISBN: 978-93-80358-17-8
5.	Machine Drawing	Bhatt, N.D.; Panchal, V. M	Charotar Publishing House, Anand, Gujarat 2010; ISBN: 978-93-80358-11-6
6	Engineering Drawing	Shah, P. J.	S. Chand and Company, New Delhi, 2008, ISBN: 81-219-2964-4

## 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](https://www.youtube.com/watch?v=dmt6_n7Sgcg)
4. [https://www.youtube.com/watch?v=\\_MQScnLXL0M](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	



## 1. COURSE DETAILS

<b>Programme: Plastic Engineering</b>	<b>Semester: I</b>
<b>Course: Workshop Practice (PE)</b>	<b>Group: C*</b>
<b>Course Code: WSP190522</b>	<b>Duration :16 Weeks</b>

## 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. Get exposure to various safety gadgets, safety processes & safety precautions to be observed while working in the workshop.
2. Get familiarized with various marking, measuring & work piece holding devices & their selection & handling.
3. Impart basic knowhow of various hand tools and their uses in different sections of workshop.
4. Get exposure to various workshop processes such as fitting, welding, soldering, brazing, and plumbing.
5. Develop a skill in dignity of labour, precision at work place, team working and development of right attitude.

## 4. SKILL COMPETENCY

The aim of the course is to develop the basic skills to identify operational use of various workshop tools and equipment's for fabrication of work piece.

The students are required to identify, operate and control various power tools and machines. They should be able to select and use various tools and equipment's for various operations and processes like welding, fitting, tapping, Plumbing and forging.

The students are advised to undergo each skill experience with remembrance, understanding and application with special emphasis on attitude of enquiry to know why and how for the various instructions and practices imparted to them in each shop.



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

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Select tools and machinery according to job	Remembering, Understanding
CO2	Identify, select and use various marking, measuring, and holding, striking and Cutting tools equipments.	Understanding, Applying
CO 3	Operate equipment and machinery in different shops.	Applying
CO 4	Prepare job according to drawing.	Applying

6. COURSE CONTENTS:

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	<p><b>PRACTICAL CONTENT</b></p> <p><b>Measuring instruments and Safety</b></p> <p>1.1 Demonstration of various marking and measuring devices such as water levels/spirit levels, steel rulers, vernier caliper, gauge meter, micrometer, protector, divider, compass, marking gauges, T-square, etc.</p> <p>1.2 Introduction to hand tools and work holding devices like spanner, wrenches, hammers, files, hack saws, hand drills, reamers, tread cutting devices, C-clamps, bench vices, magnetic holders, angle plates, etc.</p> <p>1.3 Introduction to workshop layout and safety measures, fire safety, general safety rules, safety signs and symbols, accidents prevention, safety gadgets like safety shoes, safety goggles, hand gloves, aprons, masks, fire extinguisher and first aid kits.</p>	08	-	CO 1 & CO2
2	<p><b>PRACTICAL CONTENT</b></p> <p><b>FITTING</b></p> <p>2.1 Demonstration of fitting operations, like work piece holding, chipping, filing, cutting, sawing, drilling, reaming, lapping.</p> <p>2.2 Demonstration of bench drilling machines and power tools (Pneumatic electric driven), Tapping dies and its use.</p> <p>2.3 Student will also prepare the report with sketch, specifications and applications of fitting tool demonstrated.</p> <p>2.4 One jobs- Prepare male-female type fitting jobs per student as per given drawings and specifications, involving processes like chipping, filling, drilling, reaming, lapping.</p>	22	15	CO3 & CO4



3	<b>PRACTICAL CONTENT</b> <b>WELDING</b> 3.1 Introduction of welding, soldering 3.2 Types of welding processes like arc welding, gas welding, 3.3. Demonstration of different welding tools and equipment for welding processes. 3.4 Demonstration work piece preparation prior to welding- surface and edge preparation. 3.5 Demonstration of arc welding, and gas welding, soldering process. 3.6 Student will also prepare the report with sketch, specifications and applications of welding tools demonstrated. 3.7 Prepare one job using arc welding, gas welding involving "Butt", "lap" and "T" joint, or utility article as per drawing and specifications per students	20	20	CO3
4	<b>PRACTICAL CONTENT</b> <b>PLUMBING</b> 4.1 Types of pipes, their fittings, joints & selections. 4.2 Demonstration of different plumbing tools & ancillaries. 4.3 Demonstration of different plumbing operations involving with G.I. pipes, different pipe fittings and pipe accessories. 4.4 Demonstration of different plumbing operations with PVC/CPVC pipes by solvent cementing 4.5 Student will also prepare the report with sketch, specifications and applications of pipe fitting tools demonstrated. 4.6 One job: Prepare pipe fitting job as per drawings and specifications for group of students followed by practice	14	15	CO4
<b>TOTAL</b>		64	50	

#### 7. NOTE-

- 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. Assignment on measuring instruments
  - c. Part Drawings/Designs of the job and procedure/methodology adopted for making
    - i) Job on fitting.
    - ii) Job on Welding.
    - iii) Job on Plumbing (Group of students)
- 4] Visit nearer fabricator. Collect the information on welding electrodes, transformers and accessories being used by them.
- 5] Workshop diary/Journal should be certified by the in-charge chargeman/ foreman.



## 8. IMPLEMENTATION STRATEGY (PLANNING)

1. Demonstrations
2. Preparation of jobs

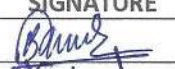
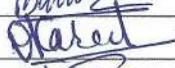
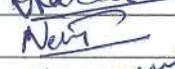
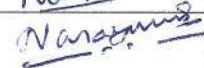
## 9. LEARNING RESOURCES

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
5.	Workshop Practice	Bawa, H.S.	McGraw Hill Education, Noida; ISBN: 978-0070671195
6.	Introduction to Basic Manufacturing Process & Workshop Technology	Singh, Rajender	New Age International, New Delhi; 2014, ISBN: 978-81-224-3070-7

## 10. WEB REFERENCES

1. <http://files.kvsrce.webnode.in/200000118-deb8cdfb49/carpen%20tools.pdf>
2. [https://www.bvrit.ac.in/Freshman\\_Lab\\_Manuals/Engineering%20Workshop/Engineering%20Workshop.pdf](https://www.bvrit.ac.in/Freshman_Lab_Manuals/Engineering%20Workshop/Engineering%20Workshop.pdf)
3. [http://www.bspublications.net/downloads/05229cf9b012a3\\_workshop\\_Ch\\_1.pdf](http://www.bspublications.net/downloads/05229cf9b012a3_workshop_Ch_1.pdf)
4. <https://www.wilhelmsen.com/globalassets/marine-products/welding/documents/wilhelmsen-ships-service---unit-or-welding-handbook.pdf>
5. [http://ecsnz.com/cimco/downloads/CIMCO\\_2017-18\\_plumbing-tools.pdf](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	Mrs. R M. Bawankar	
2	Internal	Mr. D. M. Karad	
3	Internal	Mr. Navin Tembhurnikar	
4	External	Prof. E. Narayanan Organization: <u>D. J. S. C. E</u>	



## 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	<b>Derivatives</b> 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	<b>Vector Algebra</b> 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	<b>Probability Distribution</b> 3.1 Definition of probability, addition and multiplication theory of probability 3.2 Probability Distribution <ul style="list-style-type: none"> <li>• Normal Distribution</li> <li>• Binomial Distribution</li> </ul>	06	09	CO4
4	<b>Integration</b> 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	<b>Complex Number</b> 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



<b>Statistics</b>			
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	<b>06</b>	<b>11</b>	<b>CO 4</b>
6.3 Variance and coefficient of variance			
6.4 Comparison of two sets of observation			
	<b>48</b>	<b>70</b>	

## 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
	<b>Total</b>	<b>32</b>	

## 8. IMPLEMENTATION STRATEGY (PLANNING)

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



## 9. LEARNING RESOURCES

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

## 10. WEB REFERENCES

1. [www.mic-mathematics.com](http://www.mic-mathematics.com)
2. [www.math.com](http://www.math.com)
3. [www.lernerstv.com](http://www.lernerstv.com)
4. [www.onlinetutorials.com](http://www.onlinetutorials.com)
5. [www.archieves.math.utk.edu](http://www.archieves.math.utk.edu)

## 11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

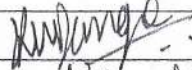
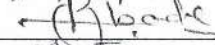
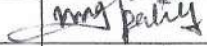

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Derivatives	7	10		17
2	Vector Algebra	2	5	2	09
3	Probability	1	5	3	09
4	Integration	5	10		15
5	Complex Number	2	5	2	09
6	Statistics	2	4	5	11
<b>TOTAL</b>		<b>19</b>	<b>39</b>	<b>12</b>	<b>70</b>

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

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



## 12. COURSE EXPERT COMMITTEE MEMBERS

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



## 1. COURSE DETAILS

Programme: CE/ME/EE/IE/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'S LEVEL
1	Estimate errors in measurement of physical quantities.	Understand, Application
2	List the use of physical properties of different materials.	Remembering
3	Use the basic principles of elasticity, surface tension, viscosity, heat and optics in related engineering applications.	Understanding
4	Apply the principles and concepts of electricity, magnetism, sound to solve engineering problems.	Application



## 6. COURSE CONTENT:

Sr.No	Topic/Sub-topic	Hours	Marks	COs
1.0	<b>1. Measurement and errors</b> 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	<b>2. Properties of matter : Elasticity , Surface Tension</b> 2.1 Elasticity : 2.1.1 Deforming force, restoring force, elastic and plastic body. 2.1.2 Stress and strain with their types. 2.1.3 Elastic limit, Hooke's law. 2.1.4 Moduli of elasticity. 2.1.5 Stress-strain diagram, behaviour of wire under continuously increasing load. 2.1.6 Definition of yield point, ultimate stress, factor of safety. 2.1.7 Numerical on stress, strain and Young's modulus. 2.2 Surface Tension : 2.2.1 Molecular force, cohesive and adhesive force, molecular range, sphere of influence. 2.2.2 Definition of surface tension and its S.I. unit, angle of contact. 2.2.3 Capillary action with examples, shape of meniscus for water and mercury. 2.2.4 Relation between surface tension, capillary rise and radius of capillary (no derivation). 2.2.5 Effect of impurity and temperature on surface tension, 2.2.6 Numerical on relation between surface tension, capillary rise and radius. 2.3 Viscosity : 2.3.1 Fluid friction, viscous force. 2.3.2 Definition of viscosity, velocity gradient. 2.3.3 Newton's law of viscosity, Definition coefficient of viscosity and its S.I. unit. 2.3.4 Streamline and turbulent flow with examples, critical velocity. 2.3.5 Variation of viscosity with temperature. 2.3.6 Reynolds number and its significance.	11	13	CO 1 CO2 CO3





5.0	<p><b>5.OPTICS</b></p> <p>5.1 Photoelectric effect :</p> <p>5.1.1 Statement of photoelectric effect, Planck's hypotheses, Einstein's equation.</p> <p>5.1.2 Definition: Threshold wavelength, Threshold frequency, Work function.</p> <p>5.1.3 Study of experimental set up for study of photoelectric effect, Study of factors on which photoelectric effect depend on. Definition: Stopping potential.</p> <p>5.1.4 Characteristics of photoelectric effect.</p> <p>5.1.5 Photocells: Photo emissive, photoconductive, photovoltaic.</p> <p>5.1.6 Engineering applications.</p> <p>5.1.7 Numerical on energy of photon, work function, Einstein's equation.</p> <p>5.2 Interference :</p> <p>5.2.1 Interference of light, Interference pattern. Constructive interference, Destructive interference. Steady interference of light.</p> <p>5.2.2 Conditions for steady interference pattern</p> <p>5.2.3 Newton's rings, Newton's rings setup, Wavelength of source of light (No derivation)</p> <p>5.2.4 Optical flatness, Engineering Applications Fiber optics Total internal reflection, optical fiber-step index and graded index, Applications.</p> <p>5.3 Diffraction :</p> <p>5.3.1 Diffraction of light, Diffraction at a slit,</p> <p>5.3.2 Diffraction Grating, Characteristics of grating spectra.</p> <p>5.4 Polarization :</p> <p>5.4.1 Polarization of light, Definition : Plane of polarization, plane of vibration</p> <p>5.4.2 Explanation of polarization of light, Nicol prism.</p> <p>5.4 X-rays :</p> <p>5.4.1 Production of X-rays, types of X-ray spectra-continuous and characteristics,</p> <p>5.4.2 X-ray wavelength (simple Problems), properties of X-rays.</p> <p>5.4.3 Applications of X-rays.</p>	11	11	CO 1 CO 2 CO 3
-----	--	----	----	----------------------



<p><b>6.0</b></p>	<p><b>6.0 ELECTRICITY AND MAGNETISM</b>          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.</p>	<p><b>10</b></p>	<p><b>10</b></p>	<p><b>CO 1</b>  <b>CO 2</b>  <b>CO 4</b></p>
-------------------	--	------------------	------------------	--



<b>7.0</b>	<b>7. MODERN PHYSICS</b> 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.	<b>10</b>	<b>10</b>	<b>CO 3</b> <b>CO 4</b>
<b>8.0</b>	<b>8.0 SUPERCONDUCTIVITY AND NANOTECHNOLOGY</b> 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.	<b>03</b>	<b>04</b>	<b>CO 2</b>
		<b>64</b>	<b>70</b>	

## 7. LIST OF PRACTICALS/ASSIGNMENTS

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

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



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

### 8.0 IMPLEMENTATION STRATEGY:

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

### 9.0 LEARNING RESOURCES:

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

### 10. WEB REFERENCES

1. [http://www.books.google.co.in/books/physics\\_Dummies\\_by\\_Steven\\_Holzner](http://www.books.google.co.in/books/physics_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.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>

<http://www.youtube.com/watch?v=SBC0C8pa2VU>, <http://www.hyperphysics.phy-astr.gsu.edu/hbase/sound/>



wavplt.html , [www.tutorvista.com/content/physics/physics-iii/waves/stationary-waves.php](http://www.tutorvista.com/content/physics/physics-iii/waves/stationary-waves.php),  
[http://www.youtube.com/watch?v=y\\_Ne17Y1h7I](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.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.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.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](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:

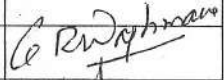
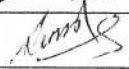
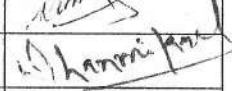

Sr.No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	MEASUREMENT AND ERRORS	2	1	1	04
2.	PROPERTIES OF MATTER : ELASTICITY , SURFACE TENSION	6	4	3	13
3.	HEAT AND TEMPERATURE.	2	2	2	06
4.	SOUND , ULTRASONIC AND ACOUSTICS	4	4	4	12
5.	OPTICS	4	4	3	11
6.	ELECTRICITY AND MAGNETISM	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: Development of Life skills

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

## 2. TEACHING AND EXAMINATION SCHEME

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

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

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

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



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

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

6. COURSE CONTENTS:

Sr. No.	TOPIC/Sub-topic	Hours	COs
1	<b>PERSONALITY DEVELOPMENT</b> 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	<b>TIME MANAGEMENT</b> 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	<b>STRESS MANAGMENT</b> 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	<b>PROBLEM SOLVING AND DECISION MAKING</b> 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	<b>POWERPOINT PRESENTATION</b> 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	<b>MOTIVATION</b> 6.1 Introduction to Motivation 6.2 Need for Motivation 6.4 Self- Motivation, 6.5 Theories of Motivation	03	CO 4
7	<b>CONFLICT MANAGEMENT</b> 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	<b>SWOT ANALYSIS</b> 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	<b>LEADERSHIP</b> 9.1 Meaning and Definition of leadership 9.2 Importance of leadership 9.3 Types of leaderships: Autocratic, Democratic, bureaucratic, Delegative, liaise Fair	03	CO 3
10	<b>INTERVIEW AND GROUP DISCUSSION</b> 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
	<b>Total</b>		<b>16</b>

**8. IMPLEMENTATION STRATEGY (PLANNING)**

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



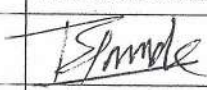
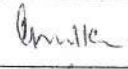
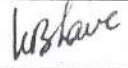
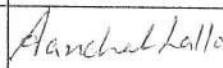
## 9. SUGGESTED LEARNING RESOURCES

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

## 10. WEB REFERENCES

1. [http://www.cbse.nic.in/cce/life\\_skills](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

<b>Programme</b> : PE/ CHE	<b>Semester:</b> II
<b>Course</b> : Organic and Physical Chemistry	<b>Group:</b> C*
<b>Course Code</b> : OPC190601	<b>Duration:</b> 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	<b>1. Fundamentals of Organic Chemistry</b> 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 $sp^3$ , $sp^2$ , $sp$ 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	<b>2. Alkanes, Alkenes, Alkynes &amp; Cycloalkanes</b> 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	<b>3. Aromatic compound</b> 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	<b>4.Solutions &amp; Indicators</b> <b>4.1</b> 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 <b>4.2 Colligative Properties:</b> 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) <b>4.3 Hydrolysis and buffer solutions:</b> 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	<b>5.Adsorption &amp; Colloids</b> <b>5.1</b> Definition, example, Mechanism of adsorption, Types of adsorption Physical adsorption, chemical adsorption, difference between physical & chemical adsorption Adsorption isotherm: Freundlich adsorption isotherm, Langmuir adsorption isotherm Application of adsorption <b>5.2 Colloidal state:</b> Preparation, purification and properties of colloidal solutions, stability and coagulation of colloids.	8	10	CO4
6	<b>6.Heterogeneous Systems</b> <b>6.1 Nernst' distribution law:</b> Calculation of partition coefficient, deviation from Nernst' distribution law, applications. (No Numerical problem) <b>6.2 Phase rule:</b> Terms involved, statement, phase diagram of water and Sulphur system.	6	10	CO5
	<b>TOTAL</b>	<b>48</b>	<b>70</b>	



## 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 RESOURCES

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](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://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
<b>TOTAL</b>		<b>35</b>	<b>28</b>	<b>07</b>	<b>70</b>

**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	<i>K.P.Bhave</i>
3	Internal	R.D.Shimpi	<i>R.D.Shimpi</i>
4	External	<i>Dr. S. Chai</i> Organaisation: <i>Mucchala Polytechnic Thane.</i>	<i>Dr. S. Chai</i>



## 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
	<b>Basic concept and principle of Electrical Engineering</b>			
1	1.1 Voltage, Electric current, Power and their relation. Resistance, Ohm's Law, Resistance in series and parallel. 1.2 Kirchoff's Laws (Only statement.) Faraday's Laws of Electromagnetic Induction 1.3 Alternating Current and Voltage. Terms related with alternating quantity. Concept of 1 $\phi$ & 3 $\phi$ AC Supply.	10	11	CO1
2	<b>D.C. Motors</b> 2.1 Construction and working Principle. 2.2 Types of D.C. Motor. 2.3 Significance of back emf. Torque, Speed and back emf ( No derivation. Only equation) 2.4 Characteristics & Applications.	7	8	CO2
3	<b>Transformer</b> 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 $\phi$ transformer and their applications.	8	8	CO3
4	<b>A.C. Motors</b> 4.1 Classification of A.C motors. 4.2 Principle, construction, Types & Applications of 3 $\phi$ Induction Motors. 4.3 1 $\phi$ Induction Motors and their applications.	7	8	CO2
5	<b>Introduction to Electronics</b>  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	<b>Rectifier and filter circuits</b> 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	<b>Amplifier</b> 7.1 Concept 7.2 Single stage transistor amplifier in CE configuration, circuit, working principle and frequency response	6	06	CO5
8	<b>Digital Electronics</b> 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
	<b>Total</b>	<b>64</b>	<b>70</b>	

## 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 Kirchoff's current law.	2	CO1
3	Verification of Kirchoff'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 RESOURCES

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 Electronics and Linear circuits	N N Bhargava D C Kulshreshtha S C Gupta	T T T I Chandigarh

## 10. WEB REFERENCES

- 1) [www.nptel.ac.in](http://www.nptel.ac.in)
- 2) [www.electricaltechnology.org](http://www.electricaltechnology.org)
- 3) [www.electrical4u.com](http://www.electrical4u.com)
- 4) [www.learningaboutelectronics.com](http://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
	<b>TOTAL</b>	<b>26</b>	<b>32</b>	<b>12</b>	<b>70</b>





## 1. COURSE DETAILS

<b>Programme: Plastic Engineering</b>	<b>Semester: II</b>
<b>Course: Material Science</b>	<b>Group: C*</b>
<b>Course Code:- MTS 190501</b>	<b>Duration :16 Weeks</b>

## 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(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
L	P	D	T		Hours	Marks							
03	-	-	-	03	03	70	20	10	70	-	-	-	100

## 3. COURSE OBJECTIVE

Students will be able to

- Understands about basics of engineering materials as regards classification, structure and properties.
- Understand basics of structure - property relationships of heat treatments.
- Analyse various types of steels and cast irons along with their specifications.
- Understand about various Non-destructive testing methods and their applications.

## 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:

To classify the metals, analyze the metals for construction of mold and its parts, various heat treatment processes, and analyze the mechanical properties of metals.

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

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	List out metals & non-metals, Define importance of material science, difference between metals and non- metals & its alloy	Remembering
2	Classify the heat treatment processes for steel & detect its defect	Remembering, Understanding
3	Identify the materials for specific applications and state factors affecting the selection of materials for engineering purpose.	Remembering, Understanding, Applying
4	Explain mechanical properties, technological properties, physical properties and Indian standard specification for metal & non-metals.	Understanding, Applying
5	Describe Iron-carbon equilibrium system & micro & macroscopic examination.	Understanding, Applying



## 6.COURSE CONTENTS:

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	<b>Introduction to material Science</b> 1.1 Definition Of Material Science and Their Importance , 1.2 Classification Metals & Non Metals ,Ferrous And Non Ferrous Metals and their alloy, 1.3 Definition of Metallurgy & their importance.	05	10	CO1
2	<b>Properties of Material</b> 2.1 Definition of Property 2.2 Classification of Properties (Spectrum) 2.3 Physical Properties of metals 2.4 Mechanical Properties - hardness, brittleness, elasticity, resilience, plasticity, yield strength, tensile strength, ductility, malleability, impact strength, creep, fatigue, wear resistance 2.4 Factors affecting. mechanical properties 2.5 Thermal Properties of metals such as heat capacity, specific heat, thermal expansion, melting point, thermal conductivity. 2.6 Technological Properties of metals and alloys such as castability, Machinability, Weldability, solderability & formability.	12	15	CO4
3	<b>Selection, specifications and commercial availability of materials</b> 3.1 Factors affecting the selection of materials for engineering purpose. 3.2 Material selection process, Some examples for selecting materials e.g. Spring, Gear, Screw Driver, mold parts etc. 3.2 ISO/Bureau of Indian standard specifications for metals, non-metals, various components and materials.	7	10	CO3
4	<b>Metals and alloys</b> (Types, Composition, Properties and uses. 4.1 Cast Irons – Classification & its Characteristics, applications 4.2 Steels: Plain Carbon Steels, Stainless Steel, tools Steels, Die Steels, Spring Still 4.2 Purpose of alloying of steel and types of steel alloy 4.3 Effect of alloying elements on properties of Steels. 4.4 Non Ferrous Metals and alloys such as Cu, Zn, Sn, Pb, AT, brass, Bronze, Gunmetal, Bearing Metal, Duralumin	10	15	CO1, CO3 CO4
5	<b>Iron-Carbon System</b> 5.1 Crystal structure of metal (Definitions) 5.2 Iron-Allotropy 5.3 Micro-constituents of iron & steel- Austenite, cementite, Ferrite, Pearlite, Bainite, martensite & sorbite 5.4 Iron carbon equilibrium diagram 5.5 Metallurgical Microscope 5.6 Micro & Macro - Examination	08	10	CO5
6	<b>Heat treatment of Steel</b> 6.1 Introduction - Definition, Purpose, Principles. 6.2 Types - Annealing, Normalizing, Hardening, Tempering 6.3 Case I Surface hardening methods Carburizing, Cyaniding, nit riding flame hardening. 6.4 Heat treatment defects	06	10	CO2
	<b>TOTAL</b>	48	70	



## 7. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Industry visit
4. Power point presentations
5. Seminar/Quiz Test

## 8. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1.	Material Science & Metallurgy	Dr. O. P. Khanna	Dhanpat Rai & Sons New Delhi
2.	Material Science & Metallurgy	Dr. V. D. Kodire	Everest Publication
3.	Material Science & Process Engineering Physical Metallurgy	S. K. Hazza Choudhary Lakhtin	Media Promoter & Public Pvt. Ltd. Mumbai Peace Publication Moscow
4	Properties & Selection Iron & Steel	A.S.M. Vol. I	American Society for Metals

## 9. WEB REFERENCES

1. <https://www.edx.org/course/materials-science-engineering-misisx-mse1x>
2. <https://www.topuniversities.com/university-rankings/university.../materials-sciences>
3. [https://www.sciencedaily.com/terms/materials\\_science.htm](https://www.sciencedaily.com/terms/materials_science.htm)
4. [https://en.wikipedia.org/wiki/Materials\\_science](https://en.wikipedia.org/wiki/Materials_science)

## 10. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

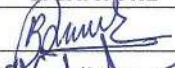

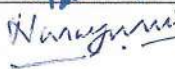

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Introduction to material Science	6	4	-	10
2	Properties of Material	3	8	4	15
3	Selection, specifications and commercial availability of materials	4	3	3	10
4	Metals and alloys	3	4	8	15
5	Iron-Carbon System	3	3	4	10
6	Heat treatment of Steel	3	4	3	10
	<b>Total</b>	<b>22</b>	<b>26</b>	<b>22</b>	<b>70</b>

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

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



### 11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mrs. R M. Bawankar	
2	Internal	Mr. D. M. Karad	
3	Internal	Mr. Sachin Kamble	
4	External	Prof. E. Narayanan	
		Organization: <u>D.J.S.C.E.</u>	



## 1. COURSE DETAILS

<b>Programme: Plastic Engineering</b>	<b>Semester: II</b>
<b>Course: Machine Drawing &amp; AutoCAD</b>	<b>Group: C*</b>
<b>Course Code: MDA190502</b>	<b>Duration :16 Weeks</b>

## 2. TEACHING AND EXAMINATION SCHEME

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

## 3. COURSE OBJECTIVE

This Course is being introduced to provide Computer aided design background needed for Plastics Diploma engineer. It intends to enable the students to apply basic utility commands of 2D, concepts and principles of advance drafting, Interpretation of surfaces of solids, joints, bearings, 3D views of solids, to draw the engineering drawings.

## 4. SKILL COMPETENCY

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

Understand the basic fundamentals of computer aided design and manufacturing, learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc. Understand the different geometric modeling techniques like solid modeling, surface modeling, and feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication.



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

CO No.	COURSE OUTCOME	Bloom's LEVEL
1	Understand the different intersections of solid shapes in assembly.	Understanding Remember
2	Draw details and assembly of mechanical systems	Apply, Remember
3	Read and interpret a given drawing	Apply
4	Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid.	Remember, Understanding
5	Understand various applications of CAD such as computer aided part programming and computer aided process planning and Perform transformations in 2D and 3D objects	Understanding, Remember, Apply

6. **COURSE CONTENTS:**

Sr. No.	TOPIC/Sub-topic	Hours	Marks	COs
1	<b>INTERPRETATION OF SURFACES OF SOLIDS:</b> 1.1 Intersections of surfaces of the solids with axis perpendicular or parallel to reference plane 1.2 Intersection of two cylinders 1.3 Intersection of prism and cylinder	04	--	CO1
2	<b>JOINTS:</b> 2.1. Cotter, cotter joints and knuckle joints. 2.2. Assembly and details of joints.	03	--	CO2
3	<b>FRictional(BUSH) BEARING:</b> 3.1 Solid Bearing 3.2 Bush Bearing 3.3 Plummer block 3.4 assembly and details of bearings.	03	--	CO2 CO3
4	<b>DETAILS AND ASSEMBLY OF MACHINE PARTS:</b> 4.1 Screw jack, 4.2 vices tool post, 4.3 simple tail stock.	02	--	CO3
5	<b>WORKING DRAWING:</b> 5.1 Weld symbol 5.2 Machining and surface finish symbol 5.3 Limits, fits and tolerances 5.4 Geometrical tolerances 5.5 Representation of the above symbols and tolerances on part drawing	04	--	CO3
6	<b>INTRODUCTION TO COMPUTER PERIPHERAL:</b> 6.1 Introduction to AUTO CAD 6.2 Concept and terminology, introducing different features, program operation, features, advance drafting.	03	--	CO4



7	<b>DRAWINGS &amp; UTILITY COMMANDS</b> 7.1 Basics drawing commands to draw primitives Like line, point arc, circle etc. 7.2 Drawing commands like Plane, donut, hatch etc. 7.3 Utility commands like end, save, status etc. 7.4 Edit & Inquiry commands-commands like copy, moves, erase, area, etc. 7.5 Different dimension type, dimensioning adding tolerance, central radius, leader, status, dim variable. 7.6 study of hatch patterns. 7.7 Study of script and slide show.	08	--	CO4
8	<b>THREE DIMENSIONAL DRAWING ON AUTOCAD</b> 8.1 Commands point, hide, view, 3D-View, elevation 3D-Polyline, 3D mesh. 8.2 UCS, UCSICON, Change property 8.3 TABSURF, REVSUR, EDGESURF, 3DARRAY 8.4 3D Operation like, ADD, SUBSTRACT.	05	--	CO4 CO5
<b>TOTAL</b>		<b>32</b>		

## 7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum -- 5 Drawings/5 CAD Drawings.

Sr. No.	Title of Experiment/Assignment	Approx.Hrs required	COs
1	Two sheets on intersection of surfaces of solids	12	CO1
2	Two sheet on joints	04	CO2
3	One sheet on working drawing.	06	CO1 CO2
4	Two sheets on bearings	08	CO2 CO3
5	Drawing development using 2D utility commands.	04	CO4
6	Drawing different projections using 2D commands	08	CO3 CO4
7	Develop an Isometric view of given 2D object.	04	CO4 CO5
8	Develop an assembly view of given 2D object.	06	CO4
9	Develop a 2D views of given 3D object.	08	CO4
10	Develop a 2D views of given of an assembly.	04	CO3
<b>TOTAL</b>		<b>64</b>	

## 8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan
2. Minimum no of practical/assignments/drawings
3. Self Learning Online Resources




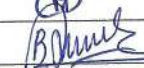
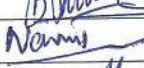
## 9. LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1.	N.D. Bhatt & Panchal	Geometrical and Machine Drawing	Rupalee publication opp. Amul Dairy, court Road, anand-388001
2.	R.K. Dhawan	Engineering Drawing	S.Chand&co. Ltd., Ram Nagar,new delhi -110055
3.	R.K. Dhawan	Machine Drawing	S.Chand&co. Ltd., Ram Nagar,new delhi -110055
4	M.L.Dabhade	Engineering Graphics	Mrs V.Avelhankar, 1030, Model colony,B-12,Akash Ganga, Pune-411016

## 10. WEB REFERENCES

1. [www.scribd.com](http://www.scribd.com)
2. [www.cecc.co.in](http://www.cecc.co.in)
3. [www.nptel.com](http://www.nptel.com)

## 11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mrs. Meghna Humbal	
2	Internal	Mrs.Rameshwari Bawankar	
3	Internal	Mr. Navin N. Tembhornikar	
4	External	SUJESH KANOJIA Organization: HAMILTON HOUSEWARES	