

# MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

## Diploma Programme in **Plastics Engineering**

### I – Scheme

#### Programme Structure

#### **Programme Educational Objectives (PEO)** (*What s/he will continue to do even after 3-5 years of working in the industry*)

- PEO 1. Provide socially responsible, environment friendly solutions to Plastics engineering related broad-based problems adapting professional ethics.
- PEO 2. Adapt state-of-the-art Plastics engineering broad-based technologies to work in multi-disciplinary work environments.
- PEO 3. Solve broad-based problems individually and as a team member communicating effectively in the world of work.

#### **Program Outcomes (PO)** given by NBA. (*What s/he will be able to do at the entry point of industry soon after the diploma programme*)

- PO 1. **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the broad-based Plastics engineering problems.*
- PO 2. **Discipline knowledge:** Apply Plastics engineering knowledge to solve broad-based Plastics engineering related problems.*
- PO 3. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Plastics engineering problems.*
- PO 4. **Engineering tools:** Apply relevant Plastics engineering tools with an understanding of the limitations.*
- PO 5. **The engineer and society:** Assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to practice in field of Plastics engineering.*
- PO 6. **Environment and sustainability:** Apply Plastics engineering solutions also for sustainable development practices in societal and environmental contexts.*
- PO 7. **Ethics:** Apply ethical principles for commitment to professional ethics, responsibilities and norms of the practice also in the field of Plastics engineering.*
- PO 8. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.*
- PO 9. **Communication:** Communicate effectively in oral and written form.*
- PO 10. **Life-long learning:** Engage in independent and life-long learning activities in the context of technological changes also in the Plastics engineering and allied industry.*

#### **Program Specific Outcomes (PSO)** (*What s/he will be able to do in the Plastics engineering specific industry soon after the diploma programme*)

- PSO 1. **Plastic technology:** Use relevant raw materials and plastic products manufacturing equipment and technologies to produce plastic products at optimal cost.
- PSO 2. **Software Usage:** Use relevant computer aided simulation software to design moulds and dies to produce plastic products at optimal cost.

## Notes for All the Semesters

1. Every student has to **separately pass in End-Semester-Examination (ESE)** for **both theory and practical** by securing minimum of 40% marks, (i.e. 30 out of 75, 28 out of 70, 20 out of 50, and 10 out of 25).
2. **Progressive Assessment (PA) for Theory** includes Written Exam/micro projects/ Assignment/Quiz/Presentations/attendance according to the nature of the course. The scheme and schedule for progressive assessment should be informed to the students and discussed with them at the start of the term. This scheme should also be informed in writing to the principal of the institute.
3. Teachers need to give **marks judiciously for PA of theory and practicals** so that there is always a **reasonable correlation** between the **ESE marks** obtained by the student and the **PA marks** given by **respective teachers for the same student**. In case the PA marks in some courses of some students seems to be relatively inflated in comparison to ESE marks, then MSBTE may review the PA records of such students.
4. For developing self-directed learning skills, from each course about 15-20% of the topics/sub-topics, which are relatively simpler or descriptive in nature are to be given to the students for self-study and proper learning of these topics should be assured through classroom presentations by students (see implementation guideline for details).

Programme Code: .....I – Scheme Diploma Programme in <b>Plastics Engineering</b>												
<b>I – Semester</b>												
Weighted mean score	S. No. & (Rank No.) of Report	Industry Questionnaire S.No.	Course Title	Teaching Scheme/Week			Credits (L+T +P)	Examination Scheme				
				L	T	P		Theory		Practical		Grand Total
								ESE	PA	ESE	PA	
3.34	G2(2)	37	English (Common to all)	3	-	2+	5	70	30*	25	25	150
2.79	26(21)	1	Basic Science	2	-	2	4	35	15*	25	25	200
2.21	35(30)	2	Physics Chemistry									
2.81	24(20)	4	Basic Mathematics (Common to all)	4	2	-	6	70	30*	-	-	100
3.22	G4(4)	45	Fundamentals of ICT (Common to all)	2#	-	2	4	-	-	25	25 <sup>~1</sup>	50
2.97	15(13)	6	Engineering Graphics Mech. Gp.(AE, ME, PT, FG, EE, CE, CH, PS, DC, TC, TX)	2#	-	4	6	-	-	50	50 <sup>~2</sup>	100
3.24	3(2)	11	Workshop Practice Mech. Gp.(AE, FG, ME, PT, CE, EE, CH, PS)	-	-	4	4	-	-	50	50 <sup>~2</sup>	100
<b>Total</b>				<b>15</b>	<b>2</b>	<b>16</b>	<b>33</b>	<b>210</b>	<b>90</b>	<b>200</b>	<b>200</b>	<b>700</b>

(#):No theory Exam; (\*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment (5 marks each for Physics and Chemistry) to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs; (+): Language Lab Practical (~):For the courses having ONLY practical examination, the PA has two parts – marks, for<sup>~1</sup> (i) practical part - 15 marks(60%) (ii) micro-project part - 10 marks (40%) and for<sup>~2</sup> (i) practical part - 30 marks (60%) (ii) micro-project part - 20 marks (40%).

### Legends

**L:** Lecture      **T:** Tutorial      **P:** Practical      **ESE:** End Semester Exam      **PA:** Progressive Assessment

**Note:** Blue highlights are courses common to all programmes and yellow highlights are courses common with other specific programmes.

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II – Semester												
Weighted mean score	S.No. & (Rank No.) of Report	Industry Questionnaire S.No.	Course Title	Teaching Scheme/Week			Credits (L+T+P)	Examination Scheme				Grand Total
				L	T	P		Theory		Practical		
								ESE	PA	ESE	PA	
2.25	32(6)	8	Basic Electrical and Electronics Engineering (PS, PT, FG, & 3 <sup>rd</sup> Sem AE, ME)	4	-	2	6	70	30*	25	25	150
2.75	22(5)	5	Computer Aided Drafting (2 <sup>nd</sup> AE, PS, 3 <sup>rd</sup> Sem FG, & 4 <sup>th</sup> Sem ME)	-	-	2	2	-	-	25	25~ <sup>1</sup>	50
2.75	20(5)	18	Instrumentation in Plastic Processes	3	-	2	5	70	30*	25	25	150
2.50	28(6)	6	Mechanical Engineering in Plastic Production	3	-	2	5	70	30*	25	25	150
2.50	26(6)	2	Organic Chemistry	3	-	2	5	70	30*	25	25	150
2.25, 3.50	33(7) 3(2)	7 10	Polymer Science	3	-	2	5	70	30*	25@	25	150
3.36	G4(3)	40	Business Communication Using Computers (Common to all)	2\$	-	-	2	35\$	15	-	-	50
<b>Total</b>				<b>18</b>	<b>-</b>	<b>12</b>	<b>30</b>	<b>385</b>	<b>165</b>	<b>150</b>	<b>150</b>	<b>850</b>

(\$): Online Exam; (\*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs; (~<sup>1</sup>): For the courses having ONLY practical, the PA has two parts (i) practical part - 15 marks (60%) (ii) micro- project part - 10 marks (40%); @: with external examiner.

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III – Semester												
Weighted mean score	S. No. & (Rank No.) of Report	Industry Questionnaire S.No.	Course Title	Teaching Scheme/Week			Credits (L+T+P)	Examination Scheme				Grand Total
				L	T	P		Theory		Practical		
								ESE	PA	ESE	PA	
2.75	23(5)	16	Hydraulics and Pneumatics for Plastic Processes	3	-	2	5	70	30*	25	25	150
3.00	16(4)	33	Testing and Quality Management for Plastics	3	-	2	5	70	30*	25	25	150
3.00, 3.00	8(4), 12(4)	15 14	Plastic Moulding Techniques	3	-	4	7	70	30*	50	50	200
4	15(3)	26	Polymer Composites	3	-	2	5	70	30*	25	25	150
3.25	5(3)	17	Plastic Processing Techniques	3	-	4	7	70	30*	50	50	200
3.25	6(2)	9	Plastic Materials	3	-	-	3	70	30*	-	-	100
<b>Total</b>				<b>18</b>	<b>-</b>	<b>14</b>	<b>32</b>	<b>420</b>	<b>180</b>	<b>175</b>	<b>175</b>	<b>950</b>

(\*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs.

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IV – Semester												
Weighted mean score	S. No. & (Rank No.) of Report	Industry Questionnaire S.No.	Course Title	Teaching Scheme/Week			Credits (L+T +P)	Examination Scheme				
				L	T	P		Theory		Practical		Grand Total
								ESE	PA	ESE	PA	
2.5, 205	30(6), 24(6)	22, 31	Finishing and Joining of Plastic	3	-	2	5	70	30*	25	25	150
3.50	2(2)	13	Maintenance of Plastic Processing Machinery	-	-	4	4	-	-	50	50 <sup>~2</sup>	100
3.00	14(4)	27	Plastic Packaging	3	-	2	5	70	30*	25	25	150
2.75	19(5)	29	Elastomer Technology	3	-	2	5	70	30*	25	25	150
2.5, 2.75	29(6), 18(5)	19, 20	Mould Manufacturing	3	-	4	7	70	30*	50	50 <sup>~2</sup>	150
2.5, 2.5, 2.5	G8(3), G9(3), G6(3)	39, 41, 40	Entrepreneurship Development (Common to all)	2\$	-	2	4	50\$	-	25	25 <sup>~1</sup>	100
<b>Total</b>				<b>14</b>	<b>-</b>	<b>16</b>	<b>30</b>	<b>330</b>	<b>120</b>	<b>200</b>	<b>200</b>	<b>800</b>

(\$): Online Exam; (\*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs; (~): For the courses having ONLY practical examination, the PA has two parts – marks, for<sup>~1</sup> (i) practical part - 15 marks(60%) (ii) micro-project part - 10 marks (40%) and for<sup>~2</sup> (i) practical part - 30 marks (60%) (ii) micro-project part - 20 marks (40%).

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V– Semester												
Weighted mean score	S. No. & (Rank No.) of Report	Industry Questionnaire S. No.	Course Title	Teaching Scheme/Week			Credits (L+T +P)	Examination Scheme				
				L	T	P		Theory		Practical		Grand Total
								ESE	PA	ESE	PA	
2.5, 3.5, 3.25	G7(3), G2(1), G5(2)	38, 42, 37	Managerial skills and TQM (DE, PS, EJ, IE & 4 <sup>th</sup> Sem IS, EE,)	3	-	-	3	70	30*	-	-	100
4, 4	1(1), 10(3)	12, 23	Moulds and Die Design	4	-	4	8	70	30*	50	50	200
3.0, 3.25	17(4), 4(3)	34, 35	Environmentally Sustainable Plastic Technologies	4	-	2	6	70	30*	25	25	150
4, 4	1(1), 10(3)	12, 23	Solid Modeling and Additive Manufacturing (ME, PS, & 4 <sup>th</sup> Sem AE)	-	-	2	2	-	-	25	25 <sup>~1</sup>	50
			Elective-I	3	-	2	5	70	30*	25	25	150
			Elective-II	3	-	2	5	70	30*	25	25	150
3.36	G4(3)	40	Technical Writing (Common to all)	-	-	2	2	-	-	25	25	50
<b>Total</b>				<b>17</b>	<b>-</b>	<b>14</b>	<b>31</b>	<b>350</b>	<b>150</b>	<b>175</b>	<b>175</b>	<b>850</b>

(\*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs; (~): For the courses having ONLY practical, the PA has two parts (i) practical part - 15 marks (60%) (ii) micro-project part - 10 marks (40%).

**Note**

The **Technical Writing** course is introduced as practical work, in which English faculty members would facilitate the framing of correct language for writing different chapters and presentation (i.e.PPT. and others) of their project work from English point of view. Name of English teacher has to be included as a 'Language Editor' in the project and this activity will be the part of practical shown against Technical Writing course at V semester. This work shall be carried out for each batch (size same as for practical).

Electives			
Weighted mean score	S. No. and (Rank No.) of Report	Industry Questionnaire S. No.	Electives
<b>Elective - I</b> (choose any one from following)			
3.0	9(4)	24	Plastic Product Designing
3.25, 3.0	7(3), 11(4)	25,21	Advanced Plastic Processing Techniques
2.25	34(7)	30	Fiber Technology
<b>Elective - II</b> (choose any one from following)			
3.0	13(4)	28	Diversified Engineering Applications of Plastics
1.75	35(8)	32	Surface Coatings
3.0	13(4)	28	Advanced Polymers

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VI – Semester												
Weighted mean score	S. No. & (Rank No.) of Report	Industry Questionnaire S. No.	Course Title	Teaching Scheme/Week			Credits (L+T+P)	Examination Scheme				
				L	T	P		Theory		Practical		Grand Total
				ESE	PA	ESE	PA					
As per feedback. Other competencies			Industrial Training and Project* (Students would also prepare a project during this training and it would be part of their evaluation as detailed in curriculum for industrial training)	-	-	33*	33**	-	-	450	450	900
<b>Total</b>				-	-	<b>33</b>	<b>33**</b>	-	-	<b>450</b>	<b>450</b>	<b>900</b>

(\*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs.

**Note**

Students would also undertake a project work during this training and it would be part of their evaluation as detailed in curriculum for industrial training.

**I – Scheme Summary of Teaching Scheme/Week, Credits and Examination Scheme**

**Plastics Engineering**

Semester	Teaching Scheme/Week			Credits (L+T+P)	Examination Scheme				
	L	T	P		Theory		Practical		Grand Total
					ESE	PA	ESE	PA	
I	15	2	16	33	210	90	200	200	700
II	18	-	12	30	385	165	150	150	850
III	18	-	14	32	420	180	175	175	950
IV	14	-	16	30	330	120	200	200	800
V	17	-	14	31	350	150	175	175	850
VI	-	-	33	33	0	0	450	450	900
<b>Total</b>	<b>82</b>	<b>2</b>	<b>84</b>	<b>189</b>	<b>1695</b>	<b>705</b>	<b>1350</b>	<b>1350</b>	<b>5050</b>

\*\*Includes Industrial Training for a one semester

