

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

Diploma Programme in **Automobile Engineering**

I – Scheme

Programme Structure

Programme Educational Objectives (PEOs) (*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 Automobile engineering related broad-based problems adapting professional ethics.
- PEO 2. Adapt state-of-the-art Automobile 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 (POs) 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 Automobile engineering problems.*
- PO 2. **Discipline knowledge:** Apply automobile engineering knowledge to solve broad-based Automobile engineering related problems.*
- PO 3. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Automobile engineering problems.*
- PO 4. **Engineering tools:** Apply relevant Automobile technologies and 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 Automobile engineering.*
- PO 6. **Environment and sustainability:** Apply Automobile 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 Automobile 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 Automobile engineering and allied industry.*

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

- PSO1: Automobile Maintenance:** Use state-of-the-art technologies in maintenance of automobiles.
- PSO2: Automobile Manufacturing Processes:** Use relevant machinery, materials, equipment and processes to manufacture automobile components.

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 Automobile Engineering													
I – Semester													
Weighted mean score	S. No. & (Rank No.) of Survey 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 Physics	2	-	2	4	35	15*	25	25	200	
2.21	35(30)	2	(Common to all) Chemistry	2	-	2	4	35	15*	25	25		
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 ⁻¹	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 ⁻²	100	
3.24	3(2)	11	Workshop Practice Mech. Gp.(AE, FG, ME, PT, CE, EE, CH, PS)	-	-	4	4	-	-	50	50 ⁻²	100	
Total				15	2	16	33	210	90	200	200	700	

(#):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⁻¹ (i) practical part - 15 marks(60%) (ii) micro-project part - 10 marks (40%) and for⁻² (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.

Programme Code:I - Scheme Diploma Programme in Automobile Engineering												
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				
				L	T	P		Theory		Practical		Grand Total
								ESE	PA	ESE	PA	
3.12	16(7)	3	Applied Mathematics (AE, CH, ME, PT, FG)	4	2	-	6	70	30*	-	-	100
2.79	26(21)	1	Applied Science	2	-	-	-	35	15*	-	-	-
2.59	32(15)	2	Mech Gp.(AE, ME, PT, FG, CE) Chemistry	2	-	2	6	35	15*	25	25	150
3.41	2(2)	5	Applied Mechanics (CE, CH, AE, ME, PT, FG)	3	2	2	7	70	30*	25	25	150
3.06	18(8)	6	Engineering Drawing (AE, ME, PT)	3	-	4	7	70	30*	25@	25	150
3.24	9(5)	7	Computer Aided Drafting (2 nd AE, PS, 3 rd Sem FG, & 4 th Sem ME)	-	-	2	2	-	-	25	25 ⁻¹	50
3.12, 3.18	15(7), G3(3)	10	Mechanical Engg. Workshop (AE, ME)	-	-	4	4	-	-	50	50 ⁻²	100
3.42	G2 (2)	37	Business Communication Using Computers (Common to all)	2\$	-	-	2	35\$	15	-	-	50
Total				16	4	14	34	315	135	150	150	750

(\$):Online 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; (~): For the courses having ONLY practical examination, the PA has two parts – marks, for⁻¹ (i) practical part - 15 marks (ii) micro-project part - 10 marks and for⁻² (i) practical part - 30 marks (ii) micro-project part – 20; @: 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				
				L	T	P		Theory		Practical		Grand Total
								ESE	PA	ESE	PA	
3.4, 2.82	2(2), 29(12)	12	Strength of Materials (AE, FG, ME, PT)	3	2	2	7	70	30*	25	25	150
3.29, 3.18	4 (4), 3G(3)	11	Materials and Manufacturing Processes	3	-	2	5	70	30*	25	25	150
3.06	18(8)	7	Automobile Engineering Drawing	1#	-	4	5	-	-	50	50 ⁻²	100
3.12	14(7)	26	Automobile Engines	3	-	4	7	70	30*	50	50	200
3.06	20(8)	30	Automobile Transmission System	3	-	2	5	70	30*	25	25	150
3.12, 3.12	13(7), 17(7)	8, 9	Basic Electrical and Electronics Engineering (AE, ME & II Sem PT, FG, PS)	4	-	2	6	70	30*	25	25	150
Total				17	2	16	35	350	150	200	200	900

(#):No theory 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; (~⁻²): For the courses having ONLY practical examination, the PA has two parts – marks for⁻² (i) practical part - 30 marks (60%) (ii) micro-project part – 20 marks (40%).

Programme Code: I - Scheme Diploma Programme in Automobile Engineering												
IV – Semester												
Weighted mean score	S. No. & (Rank No.) of Report	Industry Question naire S. No.	Course Title	Teaching Scheme/Week			Credits (L+T+P)	Examination Scheme				
				L	T	P		Theory		Practical		Grand Total
							ESE	PA	ESE	PA		
3.06	20(8)	13	Theory of Machines (AE, ME & 3 rd Sem PT)	3	-	2	5	70	30*	25	25	150
3.35, 3.18	3(3), G3(3)	22	Automobile Manufacturing Processes	3	-	2	5	70	30*	25	25	150
3.18	12(6)	26,27, 28	Advanced Automobile Engines	4	-	2	6	70	30*	25	25	150
3.00	22(9)	16	Heat Power Engineering	4	-	2	6	70	30*	25	25	150
3.06, 3.00	20(8), 23(9)	15	Automobile Systems and Body Engineering	4	-	2	6	70	30*	25	25	150
3.29, 2.94	5(4), G4(4)	17, 39	Mechanical Measurement	1#	-	2	3	-	-	25	25~ ¹	50
		IF	Solid Modeling and Additive Manufacturing (AE & 5 th Sem ME, PS)	-	-	2	2	-	-	25	25~ ¹	50
Total				19	-	14	33	350	150	175	175	850

(#):No theory 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; (~¹): 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

- During Summer Break after IV semester (i.e. between IV and V Semester), Polytechnics would ensure mandatory placement of students for 6 weeks industrial training. Preferably, the industry where students would be placed should be large or medium scale, however if such industries are not available, then students can also be placed in small or very small industries but it should be relevant to the branch or discipline of engineering. **This training would be evaluated during V semester.**
- The allotment of the group of students and orientation for industrial training shall be done before the end of IV semester.
- Students should prepare report of training, which will be evaluated during V semester.

Programme Code: I - Scheme Diploma Programme in Automobile Engineering												
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	
MSBTE guidelines and feedback			Industrial Training (during summer break after IV semester)	-	-	6 [^]	6 [^]	-	-	75	75	150
2.65, 2.41	31(14), 33(16)	37	Transport Management and Motor vehicle Act	3	-	-	3	70	30*	-	-	100
3.06	19(8)	14	Automobile Component Design	4	-	2	6	70	30*	25	25	150
3.06	21(8)	33	Vehicle Emission and Pollution Control	4	-	2	6	70	30*	25	25	150
2.94	25(10)	23	Two and Three Wheeler Technologies	4	-	2	6	70	30*	25	25	150
			Elective – I	3	-	2	5	70	30*	25	25	150
3.47, 3.24, 3.18	1 (1), 6 (5), 10 (6)	36	Entrepreneurship Development (Common to all)	2 ^{\$}	-	2	4	50 ^{\$}	-	25	25 ^{~1}	100
3.52, 3.43	G1(1), G2(2)	18	Minor Project (Common to all)	-	-	4	4	-	-	50	50 ^{~2}	100
Total				20	-	20	40[^]	400	150	250	250	1050

(\$): 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; (~¹): For the courses having ONLY practical, the PA has two parts (i) practical part - 15 marks (60%) (ii) micro- project part - 10 marks (40%); (^): Though 6 credits are allocated for Industrial Training it is only for awarding marks. As far as teaching load/time table preparation is considered, each faculty would be assigned with one batch of students (equivalent to practical batch size) for guiding the preparation of industrial training report and its evaluation. For this purpose 1 hour (or two hours on working Saturdays) teaching load would be considered.

Note
Evaluation of industrial training and its reports is to be done during this semester. Credits of Industrial Training will not affect the framing of the time table.

Weighted mean score	S. No. and (Rank No.)	Industry Questionnaire S. No.	Elective (choose any one)
2.41	33(16)	32	Elective I - Motor Vehicle Insurance and valuation
3.00	23(9)	15, 40	Elective I - Automobile Body Engineering and Safety

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VI – Semester												
Weighted mean score	S. No. & (Rank No.) of Report	Industry Questionnaire Sr. No.	Course Title	Teaching Scheme/Week			Credits (L+T+P)	Examination Scheme				
				L	T	P		Theory		Practical		Grand Total
								ESE	PA	ESE	PA	
7	24(10), 26(11)	24, 25	Hydraulic and Pneumatic Controls	3	-	2	5	70	30*	25	25	150
3.31 2.90	2(1) G7 (7)	37	Industrial Management and Quality Control	3	-	-	3	70	30*	-	-	100
3.29	5(4)	29	Automotive Electrical and Electronic Systems	4	-	2	6	70	30*	25	25	150
			Elective – II	4	-	2	6	70	30*	25	25	150
3.47, 3.24, 3.18	1 (1), 6 (5), 10 (6)	19, 30, 31	Vehicle System Maintenance	2#	-	4	6	-	-	75	75 ^{~3}	150
3.42	G2 (2)	37	Technical Writing (Common to all)	-	-	2	2	-	-	25	25	50
3.52, 3.18	G1(1), G3(3)	18	Major Project (Common to all)	-	-	6	6	-	-	75	75	150
Total				16	-	16	34	280	120	250	250	900

(#): No theory 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; (#): No theory Exam; (~¹): For the courses having ONLY practical examination, the PA has two parts – marks for ~¹ (i) practical part - 15 marks (ii) micro-project part - 10 marks.

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 VI semester. This work shall be carried out for each batch (size same as for practical).

Weighted mean score	S. No. and (Rank No.)	Industry Questionnaire S. No.	Elective II (choose any one)
2.88	27(11)	31	Elective II - Automobile Air Conditioning
3.29	5(4)	9, 29	Elective II - Autotronics

**I - Scheme Summary of Teaching Scheme/Week, Credits and Examination Scheme
Automobile Engineering**

Semester	Teaching Scheme/Week			Credits (L+T+P)	Examination Scheme				Grand Total
	L	T	P		Theory		Practical		
					ESE	PA	ESE	PA	
I	15	2	16	33	210	90	200	200	700
II	16	4	14	34	315	135	150	150	750
III	17	2	16	35	350	150	200	200	900
IV	19	-	14	33	350	150	175	175	850
V	20	-	20^	40^	400	150	250	250	1050
VI	16	-	16	34	280	120	250	250	900
Grand Total	103	8	96^	209^	1905	795	1225	1225	5150

(^): This includes total 6 credits for Industrial Training conducted during Summer Break between IV and V semester.