

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

Diploma Programme in **Computer 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 Computer engineering related broad-based problems adapting professional ethics.
- PEO 2. Adapt state-of-the-art Computer 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 diploma programme*)

- PO 1. **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the broad-based Computer engineering problem.
- PO 2. **Discipline knowledge:** Apply Computer engineering discipline - specific knowledge to solve core computer engineering related problems.
- PO 3. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Computer engineering problems.
- PO 4. **Engineering tools:** Apply relevant Computer 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 Computer engineering.
- PO 6. **Environment and sustainability:** Apply Computer engineering solutions also for sustainable development practices in societal and environmental contexts and demonstrate the knowledge and need for sustainable development.
- PO 7. **Ethics:** Apply ethical principles for commitment to professional ethics, responsibilities and norms of the practice also in the field of Computer 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 in the Computer engineering field and allied industry.

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

- PSO 1. **Computer Software and Hardware Usage:** Use state-of-the-art technologies for operation and application of computer software and hardware.
- PSO 2. **Computer Engineering Maintenance:** Maintain computer engineering related software and hardware systems.

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 Computer 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 non-Mech.Gp. (EJ, DE, IE, IS, MU, CO, IF)	2#	-	4	6	-	-	50	50 ^{~2}	100
3.24	3(2)	11	Workshop Practice Comp. Gp.(CO, IF)	-	-	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 Computer Engineering												
II – Semester												
Weighted mean score	S. No. and (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	
2.61	25(20)	2	Applied Mathematics Comp. Gp. (CO. IF)	4	2	-	6	70	30*	-	-	100
2.39 2.25	26(21), 27(22)	5,7	Basic Electronics Comp. Gp. (CO. IF)	3	-	2	5	70	30*	25	25	150
2.39	26(21)	5	Elements of Electrical Engineering Elx, Gp.(DE, EJ, IE, IS, CO, IF)	4	-	2	6	70	30*	25	25	150
3.34	9(5)	4	Programming in 'C' Comp. Gp. (CO. IF)	3	2	2	7	70	30*	25	25	150
2.7	23(18)	12	Computer Peripheral and Hardware Maintenance Comp. Gp. (CO. IF)	2#	-	2	4	-	-	50@	50~ ²	100
3.21	12(7)	8	Web Page Designing with HTML Comp. Gp. (CO, IF)	2#	-	2	4	-	-	50	50~ ²	100
3.75	G 1(1)	33	Business Communication Using Computers (Common to all)	2\$	-	-	2	35\$	15	-	-	50
Total				20	4	10	34	315	135	175	175	800

(#): 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 (ii) micro-project part – 20, @: with external examiner.

Programme Code: I – Scheme Diploma Programme in Computer Engineering												
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	
3.39	4(2)	15	Object Oriented Programming using C++ Comp. Gp. (CO. IF)	3	2	2	7	70	30*	25	25	150
3.39	5(2)	9	Data structure using 'C' Comp. Gp. (CO. IF)	3	-	2	5	70	30*	25	25	150
2.93	19(14)	16	Computer Graphics	4	-	2	6	70	30*	25	25	150
3.45	1(1)	10	Database Management System	4	2	2	8	70	30*	25	25	150
2.18	28(23)	31	Digital Techniques Elx. Gp. (DE, EJ, IE, IS, MU, CO)	4	-	2	6	70	30*	25	25	150
Total				18	4	10	32	350	150	125	125	750

(*): 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

Programme Code: I – Scheme Diploma Programme in Computer Engineering												
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	
-	-	IF	Environmental and Sustainable Energy Technologies Comp. Gp. (CO. IF)	3	-	2	5	70	30*	25	25	150
3.39	3(2)	20	Java Programming Comp. Gp. (CO. IF)	3	-	4	7	70	30*	50	50	200
2.96	17(12)	18	Software Engineering Comp. Gp. (CO. IF)	3	-	2	5	70	30*	25	25	150
3.36	7(4)	27	GUI Application Development using VB.net Comp. Gp. (CO. IF)	2#	-	4	6	-	-	50	50~ ²	100
2.95	18(13) Ocp(17)	13	Data communication and Computer Network	4	-	2	6	70	30*	25	25	150
2.16	29(24)	14	Microprocessors	4	-	2	6	70	30*	25	25	150
Total				19	-	16	35	350	120	200	200	900

(\$): 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 (~²): For the courses having ONLY practical examination, the PA has two parts – marks for ~² (i) practical part - 30 marks (ii) micro-project part – 20.

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 Computer Engineering												
V – Semester												
Weighted mean score	S. No. and (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 industry feedback			Industrial Training (During Summer Break after IV Semester)	-	-	6^	6^	-	-	75	75	150
3.0	16(11)	17	Operating Systems Comp. Gp. (CO. IF)	3	-	2	5	70	30*	25	25	150
3.45	2(1)	23	Advanced Java Programming Comp. Gp. (CO. IF)	4	-	4	8	70	30*	50	50	200
3.36	8(4)	22	Software Testing	4	-	2	6	70	30*	25	25	150
			Elective –I	3	-	2	5	70	30*	25	25	150
2.43	G8(7)	36	Entrepreneurship Development (Common to all)	2\$	-	2	4	50\$	-	25	25~	100
			Minor project (Common to all)	-	-	4	4	-	-	50	50	100
Total				16	-	22^	38^	330	120	275	275	1000

(*): 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 examination, the PA has two parts – marks, for~¹ (i) practical part - 15 marks (ii) micro-project part - 10 marks; (^): 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.
- Students have to choose any one elective group in V semester as **stream specific specialisation**, and have to take first course of that group as elective- I in V semester. They would be required to take another two courses of the same group/stream in VI semester as elective - II and elective - III. Their major and minor projects should also have emphasis preferably on the same stream of specialisation.

Weighted mean score	S. No. and (Rank No.) of Report	Industry Questionnaire S. No.	Group Number and Name of Specialization
Group A – Web Development			
3.38	6(3)	26	Elective I - Client side scripting using Java Script (CO. IF)
Group B – Network Security and Digital Forensic			
2.95	18(13)	13	Elective I - Advanced Computer Network
Group C – Data Mining			
3.45	1(1)	10	Elective I - Advanced Database Management systems

Programme Code: I – Scheme Diploma Programme in Computer Engineering													
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				Grand Total	
				L	T	P		Theory		Practical			
								ESE	PA	ESE	PA		
3.16	14(9)	19	Programming With Python	3	-	2	5	70	30*	25	25	150	
-	IF(13)	-	Mobile Application Development (CO. IF)	4	-	4	8	70	30*	50	50	200	
			Elective-II	3	-	2	5	70	30*	25	25	150	
			Elective-III	3	-	2	5	70	30*	25	25	150	
3.75	G 1(1)	33	Technical Writing (Common to all)	-	-	2	2	-	-	25	25	50	
			Major Project (Common to all)	-	-	6	6	-	-	75	75	150	
			Total	13	-	18	31	280	120	225	225	850	

(*): 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

- 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).
- Students who have chosen the **stream specific specialisation** in elective – I in V semester, should choose the same stream/group courses in elective – II and elective – III in VI semester. Their **major project** should also

have emphasis preferably on the same group/stream which could further sharpen their skills in that area.

Weighted mean score	S. No. & Rank No. of Report	Industry Questionnaire S. No.	Group Number and Name of Specialization
Group A – Web Development			
3.38	6(3). IF(20)	26	Elective II - Server Side Scripting Using JSP (CO, IF)
3.32	10(6)	25	Elective III -(Choose any one) 1) Web based Application development with PHP (CO, IF) 2) Web based Application development with PERL. (CO, IF)
Group B – Network Security and Digital Forensic			
3.16	14(9)	19	Elective II - Computer and Network Security (CO, IF)
IF	IF	IF	Elective III - Digital Forensic and Hacking Techniques (CO, IF)
Group C – Analytic and Data Mining Techniques			
	IF		Elective III - Data Warehousing and Mining
	IF		Elective II - Business Intelligence

IF: Industrial Feedback; FF: Faculty Feedback

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

Computer 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	20	4	10	34	315	135	175	175	800
III	18	4	10	32	350	150	125	125	750
IV	19	-	16	35	350	120	200	200	900
V	16	-	22	38^	330	120	275	275	1000
VI	13	-	18	31	280	120	225	225	850
Total	101	10	92	203^	1835	735	1200	1200	5000

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

