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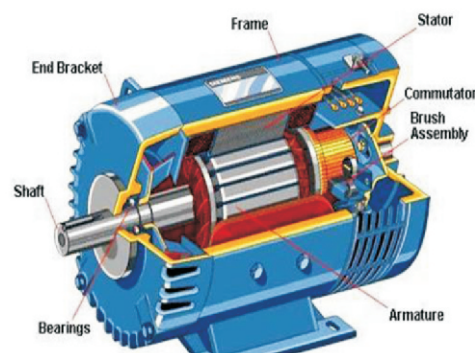
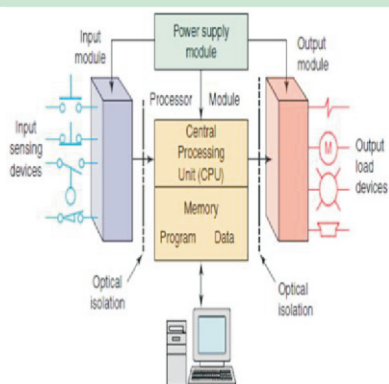
Name _____

Enrollment No. _____

Academic Years 20_____ To 20_____

ALL PROGRAMMES | DIPLOMA IN ENGINEERING AND TECHNOLOGY

GUIDELINES & ASSESSMENT MANUAL FOR MICRO PROJECTS AND INDUSTRIAL TRAINING



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI
(Autonomous) (ISO 9001 : 2015) (ISO / IEC 27001 : 2013)

VISION

To ensure that the Diploma level Technical Education constantly matches the latest requirements of technology and industry and includes the all-round personal development of students including social concerns and to become globally competitive, technology led organization.

MISSION

To provide high quality technical and managerial manpower, information and consultancy services to the industry and community to enable the industry and community to face the changing technological and environmental challenges.

QUALITY POLICY

We, at MSBTE are committed to offer the best in class academic services to the students and institutes to enhance the delight of industry and society. This will be achieved through continual improvement in management practices adopted in the process of curriculum design, development, implementation, evaluation and monitoring system along with adequate faculty development programmes.

CORE VALUES

MSBTE believes in the followings:

- Education industry produces live products.
- Market requirements do not wait for curriculum changes.
- Question paper is the reflector of academic standards of educational organization.
- Well designed curriculum needs effective implementation too.
- Competency based curriculum is the backbone of need based program.
- Technical skills do need support of life skills.
- Best teachers are the national assets.
- Effective teaching learning process is impossible without learning resources.

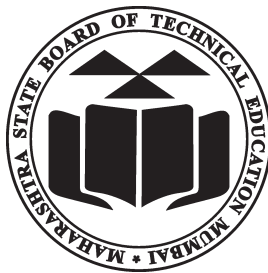
Guidelines and Assessment Manual

for

Micro Projects & Industrial Training

_____Engineering Programme

(“I” Scheme Curriculum)



**Maharashtra State
Board of Technical Education, Mumbai**

(Autonomous) (ISO:9001:2015) (ISO/IEC 27001:2013)

Preface

The primary focus of any engineering laboratory / field work / training in the technical education system is to develop the much needed industry relevant competencies and skills. With this in view, MSBTE embarked on this innovative 'I' Scheme curricula for engineering diploma programmes with outcome-based education (OBE) as the focus and accordingly, relatively large amount of time is allotted for the practical work and micro project. This displays the great importance of micro project work making each teacher; instructor and student to realize that every minute of the laboratory time need to be effectively utilized to develop these outcomes, rather than doing other mundane activities. Therefore, for the successful implementation of this outcome-based curriculum, every course has been designed to serve as a '*vehicle*' to develop this industry identified competency in every student. The practical skills are difficult to develop through 'chalk and duster' activity in the classroom situation. Accordingly, the 'I' scheme micro project guidelines & assessment manual has been developed & designed such that the micro project outlines *focus* on the *outcomes*, rather than the traditional age old practice of conducting practicals to 'verify the theory'.

This micro project guidelines and assessment manual is designed to help all stakeholders, especially the students, teachers and instructors to develop in the student the pre-determined outcomes. It is expected from each student that at the beginning of term for all related courses she/he must finalized team members and title of micro project under the guidance of course faculty. Every micro project in this manual begins by identifying the competency, industry relevant skills, course outcomes and practical outcomes which serve as a key focal point for doing the micro project. The students will then become aware about the skills they will achieve through procedure and end product in solving real-world problems in their professional life.

This manual also provides guidelines to teachers and instructors to effectively facilitate student-centered lab activities through each micro project by arranging and managing necessary resources in order that the students follow the procedures and precautions systematically ensuring the achievement of outcomes in the students.

Industrial training course is introduced to all diploma programmes with an objective to develop the traits of industry culture among the students before they enter into world of industry. By exposing and interacting with the real life industrial setting, student will appreciate and understand the actual working of an industry, best practices adopted in industry. The industrial skills like, soft skills, life skills and hands-on will be inculcated among the student. This short association with industry will be instrumental in orienting the students in transforming them into industry ready output after completion of diploma programme. In view of this Industrial Training Guidelines & Assessment Manual has been designed and developed so as to provide guidelines and formats for industry registration, implementation and assessment of industrial training.

This guideline document for micro projects & industrial training is mainly prepared and made available to the important stakeholders of polytechnic education system for its uniform implementation & assessment throughout the State. This manual may be useful for the students in the career growth even after completion of diploma programmes.

Director
MSBTE, Mumbai

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(Part-A)

**Guidelines and Assessment Manual
for**

Micro Projects

_____ **Engineering Programme**

(“I” Scheme Curriculum)



Maharashtra State Board of Technical Education

Certificate of Completion

Of Micro-Project Assessment at the end of the Diploma Programme

(By respective Head of the Department & Head of the Institute)

This is to certify that Mr./Ms.
with Enrollment No..... has successfully
completed Micro-projects as in the enclosed 'Portfolio'
during his/her tenure of completing the Diploma programme in
.....from
.....
institute with institute code

Signature

Head of the Department



Signature

Head of the Institute

**Summary Sheet of the Micro Projects Completed During the 3-year
Engineering Diploma Programme**

S. No.	Name and code of course	Title of the Micro Project	Name of Guide	Signature of Guide
Semester – I				
Semester – II				

S. No.	Name and code of course	Title of the Micro Project	Name of Guide	Signature of Guide
Semester – III				
Semester – IV				

S. No.	Name and code of course	Title of the Micro Project	Name of Guide	Signature of Guide
Semester – V				
Semester – VI				

Micro Projects

1.0 Introduction

Project work is the activity that is intended to integrate all the domains of learning i.e. cognitive, psychomotor and affective domains wherever applicable and hence, it is very important from the teacher and student point of view. Any project work is *not a research*, but an experience of doing some complex work by students on their own, or 'work-based learning'. Project can be of micro, mini, minor and major levels depending on at what stage of learning (from first semester to the last semester) it is incorporated; but all these categories will have the same characteristics. Only the amount of effort put in and time required will be changing. Therefore, the project work is defined as *'A purposeful student activity planned, designed and performed by a student or group of students to solve the identified problems (or complete a relatively complex task) which requires them to integrate the various types of skills acquired over a period to help them to accomplish higher level of cognitive and affective domain outcomes and sometimes the psychomotor domain outcomes as well'*.

This definition means that the project work leads to the integration of knowledge, skills and attitudes of the three domains of learning acquired over a period of time. It would field-based, classroom-based, lab-based, internet based, library-based or home-based. Therefore, for a micro-project also, which is related to a single course, it is not purely laboratory or field based. It is decided by pre-defined competency and course outcomes of the particular course. It could be of one particular type or a combination of different types, but the efforts by the student need to be of 16 weeks duration during the whole semester i.e. about 1 hour per week outside the classroom, in the home, in the library, laboratory, workshop or field and is intended to integrate the three domains of learning, wherever applicable. Micro-project is also intended to develop the essential *'soft and technical skills'* in the student. Therefore the choice of the micro-project is also crucial.

2.0 Salient Features of Micro-Project

Every micro-project is basically intended to integrate more than one course outcome i.e. more than one unit of the theory and the related practicals stated in the course along with the affective domain skills mentioned over there. Since it is a micro-project for a single course, it is not intended to be very complex and report is not expected to be voluminous. But, every student is expected to devote about 16 hours work for a micro-project in a group or individually during the whole semester. The *'process'* is the key which the teacher has to monitor regularly through seminars and other activities typically every fortnight online or otherwise, so that the skills are gradually built up in the students over the period of time.

One of the main purpose of micro-project is to develop the ability to work in real life settings individually or collectively as the situation may be. Following are some of the salient features of the micro-project.

- a) Micro-projects are introduced in each course to take advantage of project method of learning.

- b) The course teacher would be the guide for all groups of his/her class for that course.
- c) Micro-project is a small project which requires about 16 hours of work for all projects by students in whole semester. (i.e. about one hour each week)
- d) Students can choose micro-projects other than the sample list after consultation with their teacher.
- e) Micro-project would be given to students as a group work. (Group size should not be more than 6 students).

3.0 Abilities intended to be developed through Micro-Project

Following are the major abilities that are expected to be developed in the student through the work of 25-30 Micro-projects introduced in this outcome-based curriculum not through one course alone, but during the entire diploma programme of 3 years duration. It is not necessary that every micro-project should develop all the following abilities. *However, some of the abilities mentioned below may be common in many of the micro-projects.*

- a) Show the attitude of enquiry.
- b) Identify the problems in the area related to their branch of diploma programme.
- c) Identify the information suggesting the cause of the problem and possible solutions.
- d) Prepare project proposals before starting the project.
- e) Derive different possible solutions creatively.
- f) Assess the financial implication and feasibility of different solutions based on preliminary studies.
- g) Collect relevant data from different sources
(books/internet/market/suppliers/experts and others through surveys/interviews).
- h) Analyse the collected data and to generate useful information from it.
- i) Present generated information visually in form of appropriate charts/graphs.
- j) Prepare required drawings and detailed plan for execution of the work.
- k) Work persistently to achieve the targets.
- l) Attempts alternative solutions/revise aims/execute alternative plans, in case of failures.
- m) Use relevant machines and equipment/instruments safely.
- n) Develop the prototype/model/ of the desired equipment/instrument/machine part and such others.
- o) Show concern for material and cost reduction.
- p) Incorporate safety features in products.
- q) Work independently for the responsibility undertaken.
- r) Participate effectively in group work.
- s) Ask for help from others including guide, when required.
- t) Prepare the technical reports.
- u) Prepare presentations.
- v) Present findings/features of the projects in seminars.
- w) Confidently, answer the questions asked about the project.

- x) Acknowledge the help rendered by others in success of the project.

It is obvious from the above, that it is not necessary to have very innovative idea or to produce something new with the help of micro-project. The main purpose is to develop above skills/attitudes in the students. ***Thus micro-projects should not be very complex or research oriented, they should be such that students can complete it on their own without much help of teacher or from outside the institute.***

4.0 Report For The Micro-Project

The micro-project report has two parts. First part is 'Project Proposal' about 1-2 pages in the format given in the Annexure- I. This is related to the planning, which should be submitted by the end of fourth week of the semester. The purpose of this part is to teach the student to plan and also to ensure that students finalize their title and start working by the fourth week.

The second part is the micro-project report (Annexure II) which is to be submitted after the completion of the project prepared in black and white (no colour printing) of minimum four A4 size pages depending upon nature of the project (excluding the cover page and initial pages).

The sample evaluation of the micro-project has to be undertaken throughout the semester once in a month, section-by-section of the Report format in accordance with Annexure II to ensure the quality of the ongoing micro-project work to attain the desired COs aimed towards the development of the competency.

5.0 Cost of Micro-Project

As far as possible, no cost need to be incurred by the student for the micro-project. Since students are supposed to do one micro-project in every course, in case it becomes necessary to incurred expenditure of Micro-Project the total cost should not preferably exceed Rs.1000 per semester. However, teacher should ensure that the Micro-Project should not become financial burden on students.

6.0 Assessment of Micro-Project

Purpose of Micro-project is to not only to give the marks but to give the qualitative feedback to the students and hence rubrics would be used for assessment of the Micro-project. Rubrics are given in Annexure III. Qualitative feedback on project work would be given by teacher by ticking appropriate cells in the rubrics shown in the teacher evaluation sheet. Teachers should make it very clear to the students that marks for the project would be awarded based on the efforts put in by the students and not based on the project report only. Students shall work on their own and complete the project in the stipulated time frame. In case, they are not able to take their project to the logical end then also they shall be adequately awarded with the marks. The institutes shall keep the record of evaluated sheets of all micro projects.

The following methodology has to be adopted for the assessment of the micro-project

- a) For each Micro-project 10 Marks is earmarked for progressive Assessment.
- b) A Micro-Project Evaluation format is given in Annexure IV.
- c) In this sheet assessor would also mention the Course Outcomes achieved by the project.
- d) Out of 10 Marks 6 marks would be based on the project work. All group members would receive same marks out of 6 Marks
- e) Remaining 4 marks would be based on individual contribution to be decided by teacher by taking presentation and viva.

7.0 Micro-Projects Portfolio

- a) It is a collection of all the micro-projects completed by the student in the whole diploma programme
- b) Student would go on filling the reports of micro-projects in a portfolio (a kind of folder) along with the 'Micro Project Evaluation Sheet' of that project.
- c) In inner page of the initial pages of compiled portfolio there will be a summary sheet of all the micro-projects done by a student through all the three year diploma programme.
- d) This portfolio of about 30 micro-projects completed by them in their diploma programme will facilitate the students for securing future career prospects.

Micro-Project Proposal
(Format for Micro-Project Proposal about 1-2 pages)

Title of Micro-Project

1.0 Aims/Benefits of the Micro-Project (minimum 30-50 words)

2.0 Course Outcomes Addressed

- a)
b)
c)
d)

3.0 Proposed Methodology (Procedure in brief that will be followed to do the micro-project) in about 100 to 200 words).

4.0 Action Plan (Sequence and time required for major activity)

S. No.	Details of activity	Planned Start date	Planned Finish date	Name of Responsible Team Members

5.0 Resources Required (major resources such as raw material, some machining facility, software etc.)

S. No.	Name of Resource/material	Specifications	Qty.	Remarks

Names of Team Members with Roll Nos.

1.
2.
3.
4.

(to be approved by the concerned teacher)

Micro-Project Report
Format for Micro-Project Report (Minimum 4 pages)

Title of Micro-Project

1.0 Rationale (Importance of the project, in about 30 to 50 words. This is a modified version of the earlier one written after the work)

2.0 Aims/Benefits of the Micro-Project:

3.0 Course Outcomes Achieved (Add to the earlier list if more COs are addressed)

- a)
- b)
- c)
- d)

4.0 Literature Review

5.0 Actual Methodology Followed (Write step wise work done, data collected and its analysis (if any). The contribution of individual member may also be noted.)

6.0 Actual Resources Used (Mention the actual resources used).

S. No.	Name of Resource/material	Specifications	Qty	Remarks
1				
2				

7.0 Outputs of the Micro-Projects (Drawings of the prototype, drawings of survey, presentation of collected data, findings etc.)

8.0 Skill Developed / Learning outcome of this Micro-Project

9.0 Applications of this Micro-Project

(to be evaluated by the concerned teacher)

Suggested Rubric for Assessment of Micro Project

(The marks may be allotted to the characteristics of the Micro Project by considering the suggested rubrics)

S. No	Characteristic to be assessed	Poor (Marks 1-3)	Average (Marks 4 - 5)	Good (Marks 6 - 8)	Excellent (Marks 9- 10)
1	Relevance to the course	Related to very few LOs	Related to some Los	Addressed at-least one CO	Addressed more than one CO
2	Literature Review/information collection	Not more than two sources (primary and secondary), very old reference	At-least 5 relevant sources, at least 2 latest	At –least 7 relevant sources, most latest	About 10 relevant sources, most latest
3	Completion of the Target as per project proposal	Completed less than 50%	Completed 50 to 60%	Completed 60 to 80%	Completed more than 80 %
4	Analysis of Data and representation	Sample Size small, data neither organized nor presented well	Sufficient and appropriate sample, enough data generated but not organized and not presented well. No or poor inferences drawn	Sufficient and appropriate sample, enough data generated which is organized and presented well but poor inferences drawn	Enough data collected by sufficient and appropriate sample size. Proper inferences drawn by organising and presenting data through tables, charts and graphs.
5	Quality of Prototype/Model	Incomplete fabrication/assembly.	Just assembled/fabricated and parts are not functioning well. Not in proper shape, dimensions beyond tolerance limit. Appearance/finish is shabby.	Well assembled/fabricated with proper functioning parts. In proper shape, within tolerance dimensions and good finish . But no creativity in design and use of material	Well assembled/fabricated with proper functioning parts. In proper shape, within tolerance dimensions and good finish/appearance. Creativity in design and use of material
6	Report Preparation	Very short, poor quality sketches, Details about methods, material, precaution and conclusions omitted, some details are wrong	Nearly sufficient and correct details about methods, material, precautions and conclusion, but clarity is not there in presentation. But not enough graphic description.	Detailed, correct and clear description of methods, materials, precautions and Conclusions. Sufficient Graphic Description.	Very detailed, correct, clear description of methods, materials, precautions and conclusions. Enough tables, charts and sketches
7	Presentation of the Micro project	Major information is not included, information is not well organized .	Includes major information but not well organized and not presented well	Includes major information and well organized but not presented well	Well organized, includes major information ,well presented
8	Viva	Could not reply to considerable number of question.	Replied to considerable number of questions but not very properly	Replied properly to considerable number of question.	Replied most of the questions properly

Micro Project Evaluation Sheet**Name of Student:** **Enrollment No:**.....**Name of Programme:**..... **Semester:****Course Title:** **Code:**.....**Title of the Micro-Project:****Course Outcomes Achieved:-**

- a)
- b)
- c)
- d)

Sr. No.	Characteristic to be assessed	Poor (Marks 1 - 3)	Average (Marks 4 - 5)	Good (Marks 6 - 8)	Excellent (Marks 9- 10)	Sub Total
(A) Process and Product Assessment (Convert above total marks out of 6 Marks)						
1	Relevance to the course					
2	Literature Review/information collection					
3	Completion of the Target as per project proposal					
4	Analysis of Data and representation					
5	Quality of Prototype/Model					
6	Report Preparation					
(B) Individual Presentation / Viva (Convert above total marks out of 4 Marks)						
7	Presentation					
8	Viva					

(A) Process and Product Assessment (6 marks)	(B) Individual Presentation/Viva (4 marks)	Total Marks 10

Comments/Suggestions about team work/leadership/inter-personal communication (if any)

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.....

.....

Name and designation of the Teacher.....**Dated Signature**

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Comments/Suggestions about team work/leadership/inter-personal communication (if any)

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Name and designation of the Teacher.....**Dated Signature**

Micro Project Evaluation Sheet

Name of Student: Enrollment No:.....

Name of Programme:..... Semester:

Course Title: Code:.....

Title of the Micro-Project:

Course Outcomes Achieved:-

a)

b)

c)

d)

Sr. No.	Characteristic to be assessed	Poor (Marks 1 - 3)	Average (Marks 4 - 5)	Good (Marks 6 - 8)	Excellent (Marks 9- 10)	Sub Total
(A) Process and Product Assessment (Convert above total marks out of 6 Marks)						
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5	Quality of Prototype/Model					
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7	Presentation					
8	Viva					

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5	Quality of Prototype/Model					
6	Report Preparation					
(B) Individual Presentation / Viva (Convert above total marks out of 4 Marks)						
7	Presentation					
8	Viva					

(A) Process and Product Assessment (6 marks)	(B) Individual Presentation/Viva (4 marks)	Total Marks 10

Comments/Suggestions about team work/leadership/inter-personal communication (if any)

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.....

Name and designation of the Teacher.....

Dated Signature

Micro Project Evaluation Sheet

Name of Student: Enrollment No:.....

Name of Programme:..... Semester:

Course Title: Code:.....

Title of the Micro-Project:

Course Outcomes Achieved:-

- a)
- b)
- c)
- d)

Sr. No.	Characteristic to be assessed	Poor (Marks 1 - 3)	Average (Marks 4 - 5)	Good (Marks 6 - 8)	Excellent (Marks 9- 10)	Sub Total
(A) Process and Product Assessment (Convert above total marks out of 6 Marks)						
1	Relevance to the course					
2	Literature Review/information collection					
3	Completion of the Target as per project proposal					
4	Analysis of Data and representation					
5	Quality of Prototype/Model					
6	Report Preparation					
(B) Individual Presentation / Viva (Convert above total marks out of 4 Marks)						
7	Presentation					
8	Viva					

(A) Process and Product Assessment (6 marks)	(B) Individual Presentation/Viva (4 marks)	Total Marks 10

Comments/Suggestions about team work/leadership/inter-personal communication (if any)

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Name and designation of the Teacher.....

Dated Signature

Micro Project Evaluation Sheet**Name of Student:** **Enrollment No:**.....**Name of Programme:**..... **Semester:****Course Title:** **Code:**.....**Title of the Micro-Project:****Course Outcomes Achieved:-**

- a)
- b)
- c)
- d)

Sr. No.	Characteristic to be assessed	Poor (Marks 1 - 3)	Average (Marks 4 - 5)	Good (Marks 6 - 8)	Excellent (Marks 9- 10)	Sub Total
(A) Process and Product Assessment (Convert above total marks out of 6 Marks)						
1	Relevance to the course					
2	Literature Review/information collection					
3	Completion of the Target as per project proposal					
4	Analysis of Data and representation					
5	Quality of Prototype/Model					
6	Report Preparation					
(B) Individual Presentation / Viva (Convert above total marks out of 4 Marks)						
7	Presentation					
8	Viva					

(A) Process and Product Assessment (6 marks)	(B) Individual Presentation/Viva (4 marks)	Total Marks 10

Comments/Suggestions about team work/leadership/inter-personal communication (if any)

.....

.....

.....

Name and designation of the Teacher.....**Dated Signature**

(Part-B)

**Guidelines and Assessment Manual
for**

**Industrial Training
(22057)**

(Internship)

..... Engineering Programme

(“I” Scheme Curriculum)



Maharashtra State Board of Technical Education

Certificate of Completion

Of Industrial Training

(By respective Head of the Institute & Head of the Department)

This is to certify that Mr./Ms.
with Enrollment No. has successfully completed
Industrial Training (22049) in
from to for partial
fulfillment towards completion of Diploma in
..... from
Institute Code.....

Signature

Head of the Department



Signature

Head of the Institute

Name of Course: Industrial Training (6 weeks Duration)
Common to All Programmes

1.0 Rationale

Industrial training course is introduced to all diploma programmes with an objective to develop the traits of industry culture among the students before they enter into world of industry. By exposing and interacting with the real life industrial setting, student will appreciate and understand the actual working of an industry, best practices adopted in industry. The industrial skills like, soft skills, life skills and hands-on will be inculcated among the student. This short association with industry will be instrumental in orienting the students in transforming them into industry ready output after completion of diploma programme.

2.0 Competency

This course is intended to develop the following competencies:

- a) Soft Skill i.e. Communication, Presentation etc.
- b) Life skills i.e. Time management, Safety, Innovation, Entrepreneurship, Team building etc.
- c) Hands-on i.e. Design, Implementation, O&M and Quality Assurance aspects
- d) Industry specific tools e.g. Value Engineering, 6 Sigma and Lean.

3.0 Course Outcomes

The industrial training is intended to acquire the competencies as mentioned above to supplement those attained through several courses up to fourth semester of the program:

- a) Communicate effectively (verbal as well as written) the work carried out.
- b) Prepare and present the report of the work carried out.
- c) Exercise time management and safety in the work environment.
- d) Working in a team.
- e) Demonstrate various quality assurance.
- f) Exhibit the work carried out

4.0 Teaching & Examination Scheme

Teaching scheme (In hours)			Total Credits	Examination Scheme				
L	T	P	(L+ T+ P)	Theory Marks		Practical Marks		Total marks
				PA	ESE	PA	ESE	150
--	--	6	6	--	--	75#	75#	

Note: Both ESE and PA part of assessment will be carried out as specified in Table 1 and 2.

5.0 General Guidelines for Industrial Training

- Training during the programme:** Between 4th and 5th semester (During Summer Vacation).
- Duration of the training:** Six weeks
- Training Area:** Students should be trained in large, medium and small scale Industry / Organization.
- These Industries / Organizations can be Government / Government Undertaking / Public limited/ or Private/Family enterprises.

For **Civil engineering** it can be public works department, irrigation department, public health engineering, municipal corporations, town and country planning, highway and roads authorities, railways, large and medium scale civil contractors, rural engineering departments, environment corporations, large and medium scale private construction companies, mining companies etc.

For **Mechanical Engineering** it can be manufacturing, fabrication, foundry or processing industry which may include compressors, boilers, engines, heat exchangers, air conditioning and refrigeration plants, conveyors etc. are either manufactured or used. Power plants, Railways, process plants, ordinance factories, textile factories, automobile manufacturers or major automobile workshops.

For **Electrical engineering** it can be electricity transmission and distribution companies, power generating stations, sub stations, railways, industries manufacturing electrical products which may include industry where large motors/transformers etc. are used, process plants, electrical contractors.

For **Electronic engineering** it can be telecommunication companies, post and telegraph department, manufacturer of telecommunication product, manufacturers of control equipments, manufacturer of CNC machines, any manufacturing industry where electronic controls are used either in production process or in its products, computer hardware manufacturers, signal divisions of railways, electronic instruments repairing/testing/calibration workshops or laboratories etc.

For **Computer and IT industries** it can be any software developers, cyber security companies, web page developers, networking companies, data base management companies, telecommunication companies or IT division of any other industries/finance/retail companies or organizations where software are used and maintained for various applications.

6.0 Role of Institute

Sr. No	Activity	Schedule
1	Collecting information about Industry / Organization available for training along with capacity (Format - 1)	Before completion of 3 rd semester
2	Submission of information of Industry / Organization available for training along with capacity and its confirmation to institute coordinator	On commencement of 4 th semester
3	Student and mentor allocation as per the slots available for industrial training (Desirable mentor-student ratio is 1:15)	On commencement of 4 th semester

4	Obtaining consent letter from parents / guardian (Format - 2)	Before second Unit Test of the 4 th semester
5	Student enrollment for Internship (mapping)	Before commencement of 4 th semester examination
6	Issue letter to the Industry / Organization for the training along with details of students and mentors. (Format - 3)	
7	Mentors to carry out progressive assessment of the students during the Internship (Format - 4)	Each week of training
8	Training assessment by mentor along with Industry / Organization expert as external examiner (Format - 5)	Within 2 weeks after the start of 5 th semester
9	Submission of marks of Industrial Training	End of 5 th semester when online e-marksheet link is available

Suggestions:

- Departments can take help of alumni or present students (if they or their parents or relatives have some contact in different industries) for securing placement.
- The students would normally be placed as per their choices, in case of more demand for a particular Industry / Organization students would be allocated and placed based on their relative merit. However, if some students have arranged training placement in some companies with the help of their parents/relatives etc. then they will be given preference for placement in those companies.
- Principal/HOD/Faculty should address students about industrial safety norms, rules and discipline to be maintained in the Industry / Organization during the training before relieving students for training.
- The faculty member during the weekly visit to Industry / Organization will check the progress of the student in the training, his/ her attendance, discipline and project report preparation.

7.0 Expectations from Industry

Helping institute in developing the following competencies among students

- Soft Skill i.e. Communication, Presentation etc.
- Life skills i.e. Time management, Safety, Innovation, Entrepreneurship, Team building etc.
- Hands-on i.e. Design, Implementation, O&M and Quality Assurance aspects etc.
- Industry specific tools i.e. Value Engineering, 6 Sigma and Lean.

8.0 Roles and Responsibilities of the Students

Following should be informed to students deputing them for the training

- Students would interact with the mentor to suggest choices for suitable Industry / Organization. If students have any contact in Industry / Organization (through their parents, relatives or friends) then same may be utilized for securing placement for themselves and their peers.
- Students have to fill the forms duly signed by authorities along with training letter and submit it to training officer in the industry on the first day of training. Student should also carry with him/her the Identity card issued by institute during training period.
- He/she will have to get all the necessary information from the training officer regarding schedule of the training, rules and regulations of the Industry /

Organization and safety procedures to be followed. Student is expected to observe these rules, regulations, procedures.

- d) Students should know that if they break any rule of industry or do not follow the discipline then industry can terminate the training and sent back the students.
- e) It is the responsibility of the student to collect information from Industry / Organization about manufacturing processes / testing and quality assurance methods/specifications of machines and raw materials/maintenance procedures/ production planning/organizational structure etc.
- f) During the training period students have to keep record of all the useful information in Log book and maintain the weekly diary as provided and get it signed from mentor as well as Industry / Organization training in-charge.
- g) In case they face any major problem in industry such as an accident or any disciplinary issue then they should immediately report the same to the institute.
- h) Prepare final report about the training for submitting to the department at the time of presentation and viva.

9.0 Format for Training Report

Following is the suggestive format for the training report, actual format may differ slightly depending upon the nature of Industry / Organization. The training report may contain the following

- Title page
- Certificate
- Abstract
- Acknowledgement
- Content Page

- Chapter 1. Organizational structure of Industry / Organization and General Lay Out
- Chapter 2. Introduction of Industry / Organization (Type of products and services, history, turn over and number of employees etc.)
- Chapter 3. Types of major equipment/instruments/ machines used in industry with their specification, approximate cost and specific use and their routine maintenance.
- Chapter 4. Manufacturing Processes along with production planning and control methods.
- Chapter 5. Testing of raw materials, components and finished products along with quality assurance procedures.
- Chapter 6. Major material handling product (lifts, cranes, slings, pulleys, jacks, conveyor belts etc.) and material handling procedures.
- Chapter 7. Safety procedures followed and safety gear used (includes Preventive maintenance schedule and breakdown maintenance procedures).
- Chapter 8. Particulars of Practical Experiences in Industry / Organisation if any in Production/ Assembly/ Testing/Maintenance.
- Chapter 9. Short report/description of the project (if any done during the training)
- Chapter 10. Special/challenging experiences encountered during training

References /Bibliography:-

The size of the report may be about 20 pages.

10.0 Suggested Learning Strategies

Students should visit the website of the industry where they are undergoing training to collect information about products, processes, capacity, number of employees, turnover etc. They should also refer the handbooks of the major machines and operation, testing, quality control and testing manuals used in the industry. Students may also visit websites related to other industries wherein similar products are being manufactured as their learning resource.

11.0 Tentative Week-Wise Schedule Of Industrial Training

The industrial training is a common course to all programmes; therefore the industry / Organization selection will depend upon the nature of programme and its related industry. The training activity may vary according to nature and size of Industry / Organization. The details of activities to be completed during 6 week wise Industrial training schedule should be planned by the Industry. The plan should be intended to develop **Soft Skill** i.e. Communication, Presentation etc., **Life skills** i.e. Time management, Safety, Innovation, Entrepreneurship, Team building etc. **Hands-on** i.e. Design, Implementation and Quality Assurance aspects and **Industry specific tools** e.g. Value Engineering, 6 Sigma and Lean in each student. The evaluation of Industrial training will be done on the basis of skills acquired by the student during this 6 week period.

Table - 1 Assessment Scheme for Industrial Training

Training duration	PROGRESSIVE ASSESSMENT (Weekly report of all 6 week and attendance)		END SEMESTER ASSESSMENT (Report, Presentation and Viva)		Total marks	
	Max. marks	Min. passing marks	Max. marks	Min. passing marks	Max. marks	Min. passing marks
Six weeks	#75	30	75**	30	150	60

#assessed by mentor and concern industry supervisor

**assessed by mentor/internal and external examiner (industry personnel) based on report (25 Marks), presentation (25 Marks) and Viva (25 Marks)

Table - 2 Distribution of End-Semester-Examination (ESE) marks of Industrial Training

Marks for Industrial Training Report	Marks for Seminar/Presentation	Marks for Oral/Viva-voce	Total ESE marks
25	25	25	75

Format 1

Collecting Information about Industry/Organization available for training along with capacity:-

- 1) Name of the industry/organization:
- 2) Address/communication details with email :
- 3) Contact person details:
 - a) Name:
 - b) Designation:
 - c) Email
 - d) Contact number/s:
- 4) Type of Product:
Service Industry / Manufacturing Industry
- 5) Type of Control:
Govt. / Semi Govt. / PSU / Pvt.
- 6) Type of Company:
Large scale / Medium scale / Small scale
- 7) Total No. of employees in the Industry / Organisation :
- 8) a) Whether willing to offer Industrial training facility during May/ June for Diploma in Engineering students: Yes / No.
b) If yes, whether you offer 6 weeks training: Yes/No
c) Internship capacity possible:

Programme Engg. Group	Civil	Mechanical	Electrical	Computer	Electronics	Chemical	Textile	Instrumentation	Total
Male									
Female									
Total									

Name & Signature of Industry Person

Format 2

Consent Letter from parents/guardians

To,
The Principal,

_____ ,

Subject: Consent for Industrial Training.

Sir/Madam,

I am fully aware that -

- i) My ward _____ studying in _____ semester at your _____ institute has to undergo six weeks of Industrial training for partial fulfillment towards completion of Diploma in _____ Engineering.
- ii) For this fulfillment he/she has been deputed at _____ industry, located at _____ for industrial training of _____ weeks for the period from _____ to _____ .

With respect to above I give my consent for my ward to travel to and from the mentioned industry. Further I undertake that –

- a) My ward will be entirely under the discipline of the organization where he/she will be placed and will abide by the rules and regulations in force of the said organization.
- b) My ward is not entitled to any leave during training period.
- c) My ward will submit regularly a prescribed weekly diary, duly filled and countersigned by the training supervisor of the organization to the mentor faculty of the polytechnic.
- d) My ward will undergo the training at his/her own cost and risk during training and/or stay.

I have explained the contents of the letter to my ward who has also promised to adhere strictly to the requirements. I assure that my ward will be properly instructed to take his own care to avoid any accidents/injuries in the industry.

Date :

Signature of Parent/Guardian :

Place :

Name : _____

Address : _____

Phone Number: _____

Format 3

Letter to the Industry/Organization for the training along with details of students and mentors:

To,

The HR Manager,

Subject: Placement for Industrial training of **6** weeks in your organization.....

Reference: Your consent letter no. _____ dated _____

Sir/Madam,

With reference to the above we are honored to place the following students from this institute for Industrial training in your esteemed organization as per the arrangement arrived at.

Diploma programme in _____ Engg.

Sr. no.	Enrolment no.	Name of Student	Faculty Mentor with Mobile No.

Diploma programme in _____ Engg.

Sr. no.	Enrolment no.	Name of Student	Faculty Mentor with Mobile No.

Kindly do the needful and oblige.

Thanking you,

Yours sincerely,

(Principal)

Name of the Institute:
with Seal

Format 4

Evaluation Sheet for PA of Industrial Training

Academic year: - 20 - 20

Name of the industry:

Sr. No	Enrollment Number	Name of student	Marks (5 marks for each week) by Mentor & Industry Supervisor jointly	PA Marks by Industry Supervis or	PA Marks by mentor faculty	Total Marks
			Out of 30 (A)	Out of 25 (B)	Out of 20 (C)	Out of 75 (A)+(B)+(C)

- A) Marks for PA are to be awarded out of 5 for each week considering the level of completeness of activity observed, from the daily diary maintained.
- B) Marks are to be awarded by Industry Supervisor on the basis of General Observation and behavioral aspects of student.
- C) Marks are to be awarded by Mentor faculty on the basis of report, understanding level and work performance of the student.

Signature-

Signature-

Name and designation of the Mentor/faculty

Name and designation of the Industry Supervisor

Format 5

Evaluation Sheet for ESE of Industrial Training by Mentor and Industry Personnel

Name of Student: **Enrollment No.**.....

Name of Programme:-..... **Semester:**

Course Title :- Industrial Training **Code:**

Name of Industry:

Course Outcomes Achieved

.....

.....

.....

.....

Industrial Training Report (25 Marks)	Presentation (25 Marks)	Viva (25 Marks)	Total Marks (75 Marks)

**Comments/Suggestions about team work/leadership/inter-personal communication
(if any)**

.....

.....

.....

.....

Signature-

Signature-

Name of the Internal/Mentor

**Name of External Examiner
(Industry Personnel)**

Weekly Diary
for
Industrial Training
at

.....

From **To**.....

Name of Supervisor:

Designation of Supervisor:

Name of the Student:

Branch of Engineering:.....

Name of Polytechnic.....

(Special instructions to students:

- 1) Write down the daily activity on the same day.
- 2) Make note of the important actual activity/ies only.
- 3) Summarize at the week -end.
- 4) Add extra sheets if needed for daily or weekly activity report.)

Signature of Student:**Signature of Industrial Supervisor**.....

Week 1: From..... To.....

Expected Work:

- i. Study of organization chart of industry/plant with responsibilities of the different posts
- ii. General Study of industry, its location, its history and its product range, its size, number of employees, its turnover etc.

Day	Activities carried out
1	
2	
3	
4	
5	
6	

Weekly summarization of the above activities:

Signature of Student:Signature of Industrial Supervisor.....

Week 2: From..... To.....

Expected Work: Study of layout and specifications of major machines, equipment and raw materials/components used.

List the Sections of Industry visited and list the major machines, equipment and raw materials etc. studied:

Day	Activities carried out
1	
2	
3	
4	
5	
6	

Weekly summarization of the above activities:

Signature of Student:Signature of Industrial Supervisor.....

Week 3: From..... To.....

Expected Work: Study of production processes along with production planning and control procedures.

List the Sections of Industry visited and list the major production process, and products for which planning and control procedures etc. are studied:

Day	Activities carried out
1	
2	
3	
4	
5	
6	

Weekly summarization of the above activities:

Signature of Student:Signature of Industrial Supervisor.....

Week 4: From..... To.....

Expected Work: Study of testing and quality assurance processes.

List the Sections of Industry visited and list the major testing and quality assurance processes studied there.

Day	Activities carried out
1	
2	
3	
4	
5	
6	

Weekly summarization of the above activities:

Signature of Student:**Signature of Industrial Supervisor:**.....

Week 5 From..... To.....

Expected Work: Study of preventive and breakdown maintenance & safety Practice adopted in industry.

List the Sections of Industry visited and list

- (i) the major machines/plants whose preventive and breakdown maintenance procedures studied.
- (ii) The major safety practices adopted in the industry
- (iii) Organization chart of the industry with responsibilities of different departments/posts

Day	Activities carried out
1	
2	
3	
4	
5	
6	

Weekly summarization of the above activities:

Signature of Student:Signature of Industrial Supervisor.....

Week 6 : From.....To.....**Expected Work:** Report writing

List the Sections of Industry visited and list the major manuals/broachers such as operational manual, safety manual, maintenance manual, quality manuals referred/ studied there for preparation of reports.

Day	Activities carried out
1	
2	
3	
4	
5	
6	

Weekly summarization of the above activities:

Signature of Student:Signature of Industrial Supervisor.....

List Of Laboratory Manuals Developed by MSBTE

First Semester:

1	Fundamentals of ICT	22001
2	English	22101
3	English Work Book	22101
4	Basic Science (Chemistry)	22102
5	Basic Science (Physics)	22102

Second Semester:

1	Business Communication Using Computers	22009
2	Computer Peripherals & Hardware Maintenance	22013
3	Web Page Design with HTML	22014
4	Applied Science (Chemistry)	22202
5	Applied Science (Physics)	22202
6	Applied Machines	22203
7	Basic Surveying	22205
8	Applied Science (Chemistry)	22211
9	Applied Science (Physics)	22211
10	Fundamental of Electrical Engineering	22212
11	Elements of Electronics	22213
12	Elements of Electrical Engineering	22215
13	Basic Electronics	22216
14	'C' programming Language	22218
15	Basic Electronics	22225
16	Programming in "C"	22226
17	Fundamentals of Chemical Engineering	22231

Third Semester:

1	Applied Multimedia Techniques	22024
2	Advanced Surveying	22301
3	Highway Engineering	22302
4	Mechanics of Structures	22303
5	Building Construction	22304
6	Concrete Technology	22305
7	Strength Of Materials	22306
8	Automobile Engines	22308
9	Automobile Transmission System	22309
10	Mechanical Operations	22313
11	Technology Of Inorganic Chemicals	22314
12	Object Oriented Programming Using C++	22316
13	Data Structure Using 'C'	22317
14	Computer Graphics	22318
15	Database Management System	22319
16	Digital Techniques	22320
17	Principles Of Database	22321
18	Digital Techniques & Microprocessor	22323
19	Electrical Circuits	22324
20	Electrical & Electronic Measurement	22325
21	Fundamental Of Power Electronics	22326
22	Electrical Materials & Wiring Practice	22328
23	Applied Electronics	22329
24	Electrical Circuits & Networks	22330
25	Electronic Measurements & Instrumentation	22333
26	Principles Of Electronics Communication	22334
27	Thermal Engineering	22337
28	Engineering Metrology	22342
29	Mechanical Engineering Materials	22343
30	Theory Of Machines	22344

Fourth Semester:

1	Hydraulics	22401
2	Geo Technical Engineering	22404
3	Chemical Process Instrumentation & Control	22407
4	Fluid Flow Operation	22409
5	Technology Of Organic Chemicals	22410
6	Java Programming	22412
7	GUI Application Development Using VB.net	22034
8	Microprocessor	22415
9	Database Management	22416
10	Electric Motors And Transformers	22418
11	Industrial Measurements	22420
12	Digital Electronics And Microcontroller Applications	22421
13	Linear Integrated Circuits	22423
14	Microcontroller & Applications	22426
15	Basic Power Electronics	22427

16	Digital Communication Systems	22428
17	Mechanical Engineering Measurements	22443
18	Fluid Mechanics and Machinery	22445
19	Fundamentals Of Mechatronics	22048

Fifth Semester:

1	Design of Steel and RCC Structures	22502
2	Public Health Engineering	22504
3	Heat Transfer Operation	22510
4	Environmental Technology	22511
5	Operating Systems	22516
6	Advanced Java Programming	22517
7	Software Testing	22518
8	Control Systems and PLC's	22531
9	Embedded Systems	22532
10	Mobile and Wireless Communication	22533
11	Industrial Machines	22523
12	Switchgear and Protection	22524
13	Energy Conservation and Audit	22525
14	Power Engineering and Refrigeration	22562
15	Solid Modeling and Additive Manufacturing	22053
16	Guidelines & Assessment Manual for Micro Projects & Industrial Training	22057

Sixth Semester:

1	Solid Modeling	17063
2	Highway Engineering	17602
3	Contracts & Accounts	17603
4	Design of R.C.C. Structures	17604
5	Industrial Fluid Power	17608
6	Design of Machine Elements	17610
7	Automotive Electrical and Electronic Systems	17617
8	Vehicle Systems Maintenance	17618
9	Software Testing	17624
10	Advanced Java Programming	17625
11	Mobile Computing	17632
12	System Programming	17634
13	Testing & Maintenance of Electrical Equipments	17637
14	Power Electronics	17638
15	Illumination Engineering	17639
16	Power System Operation & Control	17643
17	Environmental Technology	17646
18	Mass Transfer Operation	17648
19	Advanced Communication System	17656
20	Mobile Communication	17657
21	Embedded System	17658
22	Process Control System	17663
23	Industrial Automation	17664
24	Industrial Drives	17667
25	Video Engineering	17668
26	Optical Fiber & Mobile Communication	17669
27	Therapeutic Equipment	17671
28	Intensive Care Equipment	17672
29	Medical Imaging Equipment	17673

Pharmacy Lab Manual

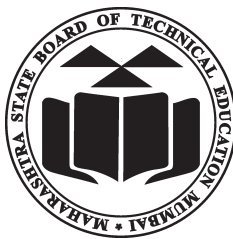
First Year:

1	Pharmaceutics - I	0805
2	Pharmaceutical Chemistry - I	0806
3	Pharmacognosy	0807
4	Biochemistry and Clinical Pathology	0808
5	Human Anatomy and Physiology	0809

Second Year:

1	Pharmaceutics - II	0811
2	Pharmaceutical Chemistry - II	0812
3	Pharmacology & Toxicology	0813
4	Hospital and Clinical Pharmacy	0816

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