


Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	Course Title: PROJECT WORK (Mechanical Stream)		
	Scheme (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15ME66P
	Type of Course: Practice	Credit : 03	Core/ Elective: Practice
CIE- 25 Marks		SEE- 50Marks	

Prerequisites: Application learned concepts form the previous semester studied courses.

Course Objectives:

1. Learn the objective of this project is to provide opportunity for the students to implement their skills acquired in the previous semesters to practical problems/problems faced by industry/development of new facilities
2. Make the students come up with innovative/ new ideas in his area of interest.
3. Identify, analyze and develop opportunities as well as to solve broadly defined mechanical Engineering problems
4. Enhance students' appreciation of the values of social responsibility, legal and ethical principles, through the analysis and discussion of relevant articles and real time projects

Course outcome

On successful completion of the course, the students will be able to:

Course Outcome		CL	Linked PO	Allotted hours
CO1	Get an idea and confidence in designing, analysing and executing the project.	Analysis/creation	1,2,3,4,8,9,10	6hrs/Week
CO2	Apply the knowledge of latest trends in fabrication/ manufacturing and Relate their ideas while executing the project	Analysis/creation	1,2,3,4,8,9,10	
CO3	Have complete understanding of Executing the project	Analysis/creation	1,2,3,4,8,9,10	
CO4	Prepare documents in team and enhance his written and oral communication presentations.	Analysis/creation	1,2,3,4,8,9,10	
CO5	Develop individual confidence to handle various engineering assignments and expose themselves to acquire life skills to meet societal challenges	Analysis/creation	1,2,3,4,5,8,9,10	
		TOTAL		78 Hours



MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments a practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
PROJECT WORK	1	3	3	2	1	0	0	3	2	3
<p>Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed. Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO. If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3 If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2 If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1 If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.</p>										

1. PROJECT WORK:

78 HRS

A. INTRODUCTION

The objective of the project work is to enable the students in convenient groups of minimum of 5 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution. Six periods per week shall be allotted in the time table and this time shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.

B. ROAD MAP FOR THE PROJECT

1. Carry out a session or a seminar from the ISTE Student Chapter coordinator / Programme coordinator with the help of Innovation club / I I I cell for directing the students to identify project areas in the field of their interested including interdisciplinary areas.
2. Power point presentation in seminar should include detail description of project areas related to program, Project report formats, developing personnel writing skills.
3. The Students/Departments may at liberty to form the batch not less than 5 and maximum 8 and get registered with project coordinator/HOD at the end of V semester.
4. Students should take the approval from the Project committee/ Head of department for doing project.
5. After approval the batch of students will be published in department notice board along with guide in the end of 5th semester.
6. All students should finalize their Project immediately before commencement of SEE of 5th semester.
7. The types of project may include:
 - Industrial case study



- Preparation of a feasibility report
 - Design and development of equipment.
 - The overhauling of existing equipment
 - Creation of New facilities
8. The project should be challenging but manageable within the resources and time available.
 9. Students should undergo reviews for one time in 5th and one time in 6th semester during the internal assessment. Time table for IA should include project review. The guide should monitor the progress of Project work periodically and it should be finally evaluated for 25 marks at the end of 5th semester and for 25 marks at the end of 6th semester.
 10. The IA marks will be evaluated based on oral presentation and assessment by the internal guide by adopting Rubrics being developed by Project committee.
 11. Real time problems, Industry related problems, should be chosen and it is a Responsibilities of the project committee / Programme coordinator/ Innovation club / I.I.T. cell to choose the appropriate project and to accept the Project Proposal
 12. **Identification of Topic:** The selection of topic is of crucial importance. It should be field of interest. It is advisable to choose the project can be completed on time and within the budget and resources. The topic should be clear, directional, focussed and feasible.
 13. An outline of project proposal submitted & synopsis from student will initiate a dialogue between Student and Project coordinator who will then help you to work on the chosen topic and report.

C. Industrial visit

Students are required to undergo an industrial visit for period of at least 3(Three) working days, in V semester only. After completion of their visit the reports should be prepared. Each Student should write the report independently in view of his own observation in industry. All days for the visit should be accounted for clearly giving attendance particulars. The concern accompanying staff is to check student presence and access progress periodically

D. Industrial report

Students are required to submit a comprehensive report on factory visit with details of the organization where the training was undergone. The comprehensive report should focus on study of plant/ product /process/ along with intensive in-depth study on anyone of the topics such as processes, methods, tooling, plant layout and equipment, highlighting aspects of quality, productivity of the system. Any data, drawings etc should be incorporated with the consent of the Organization. The comprehensive report should be submitted for the end exam for evaluation

E. Thrust areas identified for Project work

Each student may be assigned any one of the following types of project/thesis work:

According to the local needs, the following major projects are suggested:

1. Non-conventional energy



- Low Cost Solar Water Heating System for Domestic Purpose
 - Fabrication of Solar cooker
 - Study of Community Biogas Plant
 - Fabricate a thermally efficient wood burning stove
 - Solar lamps
 - Solar powered refrigerator
2. Mechatronics/Material handling area
 - Motorized object lifting jack
 - Key controlled- fork lifter
 - Object counting machine
 - Stepper motor control with selected steps for conveyor belts
 - Robotic arm with gripper
 - Material handling device in X,Y,Z motion control
 - Robotic crane
 - Robotic trolley for material handling
 3. Fluid power and control area
 - Pneumatic/Hydraulic jack
 - Pneumatic/hydraulic crane
 - Air compressed spray gun
 - Pneumatic transport system
 4. Automobile related area
 - Regenerative braking system
 - Steering controlled headlight
 - Engine/motor vibration checker
 - Seat belt automatic locking system
 - Hydraulic braking
 - Electromagnetic shock absorber
 - Digital auto speed limiter
 5. Motorized wheel chair
 6. Design and Fabrication of various types of lab equipment's useful to polytechnic
 7. Repair and overhauling of various machine tools and lab equipment's available at polytechnic
 8. Critical Study of existing quality systems and inventory control at industry
 9. Mechanical industry fabrication related projects
 10. Automatic mopping machine to clean the floor area
 11. Automatic milling machine with digital control
 12. PCB fabrication
 13. Any study project related to Mechanical and allied areas in industry
 14. Any project related to industry based problems
 15. Any projects related to low cost automation



F. Course Assessment and Evaluation Scheme for Project work

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment met	CIE	IA	Students	At the end of 5 semester)	25	1. Project Synopsis. 2. Plan & Schedule 3. Industrial visit report	CO1, CO2, CO3,CO4,CO5
				At the end of 6 semester)	25	1. Project Report. 2. Presentation hand outs	CO1, CO2, CO3,CO4,CO5
	SEE	End Exam		End of the course	50	CO1, CO2, CO3,CO4,CO5 Project report project model/Study report	
Indirect Assessment	Student Feedback on course		Students	Middle of the course	Feedback forms		CO1 Delivery of course
	End of Course Survey			End of the course	Questionnaires		CO1 to CO5 Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

G. Project report

The Project Report should consist of following items.

1. Introduction
2. Review of Literature
3. Study Area
4. Methodology/Design/fabrication/Tests
5. Result and Discussion
6. Conclusion and scope for future study
7. References.

1. Project reports should be typed neatly in Times New Roman letters with font size 14 for titles and 12 for text on both sides of the paper with 1.5 line spacing on a A4 size paper (210 x 297 mm). The margins should be: Left - 1.5", Right - 1", Top and Bottom - 0.75".

2. The total number of reports (**Soft bound**) to be prepared are

- One copy to the department /library



- One copy to the concerned guide(s)
 - One copy to the candidate.
3. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.
4. Every copy of the report must contain
- Inner title page (White)
 - Outer title page with a plastic cover
 - Candidate declaration and Certificate in the format enclosed both from the institution and the organization where the project is carried out.
 - An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.
5. The organization of the report should be as follows

<ol style="list-style-type: none"> 1. Inner title page 2. Abstract or Synopsis 3. Acknowledgments 4. Table of Contents 5. List of table & figures (optional) 	Usually numbered in roman
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Chapters(to be numbered in Arabic) containing Introduction-, which usually specifies the scope of work and its importance and relation to previous workand the present developments, Main body of the report divided appropriately into chapters, sections and subsections.

The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.

The **chapter must be left or right justified (font size 16)**. Followed by the **title of chapter centered (font size 18)**, **section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16** and **subsection and its heading in font size 14**. The **body or the text** of the report should have font size 12.

The figures and tables must be numbered chapter wise

The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.

Reference or Bibliography: The references should be **numbered serially** in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.

1. For textbooks – Dr.Paramar S, Welding process and technology, Khanna publishers, New Delhi, 2 Edition, 2003.
2. For papers – Y.Javadi and I.sattari, Welding distortion in pipes, Journal of pressure vessels and piping, Vol 85, Aug 2008, pp 337-343



Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g.

▪ $V = IZ$ (3.2)

All equation numbers should be right justified.

Separator sheets, used if any, between chapters, should be of thin paper

I.CIE ASSESSMENT FOR FINAL REVIEW(VI semester)

1. Relevance of the subject in the present context	05 mark
2. Literature Review	05 mark
3. Plan and schedule of Fabrication of the model /Data collection/repair and Overhauling work /creation	10mark
4. Results & Discussion	05 mark

25 Marks

J.SEE ASSESSMENT:

1. Relevance of the subject in the present context	05 mark
2. Literature Review	05 mark
3. Fabrication of the model/Data collection/repair and Overhauling work/creation	25 mark
4. Results & Discussion	05 mark
5. Presentation	10 mark
TOTAL	50 mark



MODEL OF RUBRICS FOR ASSESSING REVIEWS OF PROJECT FOR CIE

Student name	Reg no	Dimension	Scale				Students Score						
			Unsatisfactory	Developing	satisfactor y	Good	Exemplary	1	2	3	4	5	
		Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic						
		Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles						
		Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.						
		Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount						
Grand Average/Total													



APPENDIX 1 (Cover page)

(A typical Specimen of Cover Page)

TITLE OF PROJECT REPORT

<1.5 line spacing>

A PROJECT REPORT

Submitted by

<Italic>

NAME OF THE CANDIDATE(S)

in partial fulfilment for the award of the diploma

of

<1.5 line spacing><Italic>

DIPLOMA IN MECHANICAL ENGINEERING PROGRAMME

IN

DEPARTMENT OF MECHANICAL ENGINEERING

LOGO



NAME OF THE COLLEGE

DEPARTMENT OF TECHNICAL EDUCATION

BENGALURU-560001

<1.5 line spacing>

Year of submission: (MONTH & YEAR)



APPENDIX 2 (Title page)

(A typical Specimen of Title Page)

A Project Report
on

<TITLE OF THE PROJECT WORK>

Submitted for partial fulfilment of the requirements for the award of the
of

DIPLOMA IN CIVIL ENGINEERING

**BY
BATCH**

<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>
<Mr. / Ms. Name of the Student (Roll No.)>

Under the guidance of

<Name of the Staff>

Lecturer

Department of ME

GPT, Place-----



Department of Mechanical Engineering

<<NAME OF INSTITUTE>>

<<ADDRESS OF INSTITUTE>>



APPENDIX 3 (Certificate)

(A typical specimen of Bonafide Certificate)

**DEPARTMENT OF TECHNICAL EDUCATION
BENGALURU-560001**

BONAFIDE CERTIFICATE

Certified that this project report “.....TITLE OF THE PROJECT.....”is the bonafide work of “.....NAME OF THE CANDIDATE(S).....”who carried out the project work under my supervision.

<<Signature of the Head of the Department>>

<<Signature of the Project coordinator>>

SIGNATURE

SIGNATURE

<<Name>>

<<Name>>

HEAD OF THE DEPARTMENT

PROJECT CORDINATOR

<<Academic Designation>>

<<Department>>

Department of Mechanical Engineering

<<Full address of the Dept & College >>
College >>

<<Full address of the Dept &

Examiners 1.....<<Signature, Name, Designation& Address>>.....

Examiners 2.....<<Signature, Name, Designation& Address>>.....



APPENDIX 4 (Candidate declaration)

CANDIDATE'S DECLARATION

I, ----- a student of Diploma in ----- Department bearing Reg No-----of ----- hereby declare that I own full responsibility for the information, results and conclusions provided in this project work titled “-----“submitted to **StateBoard of Technical Examinations, Government of Karnataka** for the award of Diploma in -----.

To the best of my knowledge, this project work has not been submitted in part or full elsewhere in any other institution/organization for the award of any certificate/diploma/degree. I have completely taken care in acknowledging the contribution of others in this academic work. I further declare that in case of any violation of intellectual property rights and particulars declared, found at any stage, I, as the candidate will be solely responsible for the same.

Date:

Place:

--

Signature of candidate

Name: -----

Reg No-----



APPENDIX 5 (Certificate issued by guide)

DEPARTMENT OF TECHNICAL EDUCATION

NAME OF THE INSTITUTION

Address with pin code

Department of

CERTIFICATE

Certified that this project report entitled -----
-----”which is being
submitted by Mr./Ms., Reg. No....., a
bonafide student ofin partial fulfilment for the award of
Diploma in -----Engineering during the year is record of
students own work carried out under my/our guidance.It is certified that all
corrections/suggestions indicated for internal Assessment have been incorporated in the
Report and one copy of it being deposited in the polytechnic library.

The project report has been approved as it satisfies the academic requirements in respect of
Project work prescribed for the said diploma.

It is further understood that by this certificate the undersigned do not endorse or approve any
statement made, opinion expressed or conclusion drawn there in but approve the project only
for the purpose for which it is submitted.

Guide(s)

Name and signature

Examiner 1
2

Head of Department

Dept. of -----



APPENDIX 6

Format of Synopsis

1. Title of the Project
2. Objectives of the study
3. Rationale for the study
4. Statement of the Problem
5. Detailed Methodology to be used for carrying out the study
6. The expected contribution from the study (to perform any laboratory experiments)
7. List of activities to be carried out to complete the project (with the help of a bar chart showing the time schedule)
8. Places/labs/equipment and tools required and planning of arrangements
9. Problems envisaged in carrying out the project, if any.
10. Brief description of project in 100 words



APPENDIX-7 (PROJECT-TIME LINE)

SL.No	TASK	Responsibility	END OF V SEMESTER					VI SEMESTER																
			11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
	WEAKS																							
1	Industrial visit	Students/Faculty																						
1	Seminar regarding Project work	Project Com/HOD																						
2	Batch formation &Guide allocation	HOD																						
3	Identification of project	Students/Guide																						
4	Project synopsis Submission	Students																						
5	Finalisation of Project	Students/Guide																						
6	Literature survey	Students/Guide																						
7	Identification of facility to do PW	Guide																						
8	Study/Fabrication/design of model	Students/Guide																						
9	Results discussion/performance testing	Students																						



