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

	Course Title: **PROJECT WORK (Automobile Stream)**		
	Scheme (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code:15AT66P
	Type of Course: **Practice**	Credit **:03**	Core/ Elective: **Practice**
CIE- 25 Marks			SEE- 50Marks

Prerequisites: knowledge of applying the concepts learnt in the previous semesters.

Course Objectives:

1. Provide opportunity for the students to implement their skills acquired in the previous semesters to practical problems/problems faced by industry/Workshop/Authorised service station/STU/development of new facilities

2. Make the students come up with innovative/ new ideas in his area of interest.
3. Identify, analyse and develop skill to solve broadly defined Automobile 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	Construct an idea and develop confidence in designing, analysing and executing the project.	Application/Analysis/creation	1 to 10	**6hrs/Week**
CO2	Apply the knowledge of latest trends in automobile components/ system and Relate their ideas while executing the project.	Application/Analysis/creation	1 to 10	
CO3	complete understanding of Executing the project	Application/Analysis/creation	1 to 10	
CO4	Prepare documents in team and enhance written and oral communication presentations.	Application/Analysis/creation	1 to 10	
CO5	Develop individual confidence to handle various engineering assignments and expose themselves to acquire life skills to meet societal challenges	Application/Analysis/creation	1 to 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 and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
PROJECT WORK	3	3	3	3	3	3	3	3	3	3
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 ≥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.

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&maximum of 8 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/IEI 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 through Project Proposal Proforma (Appendix 8).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 three times 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 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. 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
    a) Solar bicycle
    b) Solar scooter/motorcycle
    c) Solar power battery charger
    d) Wind power battery charger
    e) Solar car
2. Applications of electrical in Automobiles
    a) Motorized vehicle lifting jack
    b) Electrical vehicles
    c) Electro-magnetic brakes
    d) Electric mirrors
    e) Electromagnetic clutch
    f) Power windows (motorised)
    g) Battery charger
3. Applications of electronics in Automobiles
    a) Automatic wiper
    b) Tilting head lights
    c) Automatic Dipper
    d) Low tyre pressure Indicator
    e) Digital speedometer
    f) Digital fuel gauge
    g) Rear view camera
4. General Automobile field
    a) Regenerative braking system
    b) Steering controlled headlight
    c) Seat belt automatic locking system
    d) Hydraulic braking
    e) Electromagnetic shock absorber
    f) Digital auto speed limiter

5. Design and Fabrication of various types of lab equipment's useful to the juniors.
7. Repair and overhauling of various Automobile components/system and lab equipment's Available at polytechnic
8. Reconditioning of petrol/Diesel engine
09. Reconditioning of Hydraulic braking system.
10. Reconditioning of Air braking system
11. Reconditioning of Independent suspension system
12. Reconditioning of Gear box (any one)
13. Reconditioning of Steering. Systems
14. Painting of a vehicle
15. Implementation of 5S concept.
16. Construction of Battery.
17. Reconditioning of Starter motor/Alternator
18. Replacement/preparation of auto-electrical wiring
19. Tyre Retreading
20. Collection and analysis of data related automobile Engineering
21. Reconditioning of Two wheeler/Three wheeler/Four wheeler
22. Any agricultural based project (Harvesting/Sugarcane cutter/etc)
23. Project on alternate fuels/hybrid Technology
24. Preparation of teaching aids related to automobile engg,
25. Any study project related to Automobile and allied areas in field
26. Any project related to industry/workshop based problems
27. Any projects related to low cost automation
28. Projects related to multi-disciplinary.

(Above list is a just an example. you can choose the project apart from the list)

D. Course Assessment and Evaluation Scheme for Project work

<table>
<tr><th></th><th colspan="2">What</th><th>To whom</th><th>When/Where (Frequency in the course)</th><th>Max Marks</th><th>Evidence collected</th><th>Course outcomes</th></tr>
<tr><td rowspan="3">Direct Assessment met</td><td rowspan="2">CIE</td><td rowspan="2">IA</td><td rowspan="3">Students</td><td>At the end of semester</td><td>25</td><td>1. Project Proposal Performa.
2. Project Synopsis.
3. Plan & Schedule
4. Presentation hand outs</td><td>1,2,3,4,5</td></tr>
<tr><td>End of the course</td><td>50</td><td colspan="2">1,2,3,4,5
Project report project model/Study report</td></tr>
<tr><td>SEE</td><td>End Exam</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Indirect Assessment</td><td colspan="2">Student Feedback on course</td><td rowspan="2">Students</td><td>Middle of the course</td><td colspan="2">Feedback forms</td><td>CO1
Delivery of course</td></tr>
<tr><td colspan="2">End of Course Survey</td><td>End of the course</td><td colspan="2">Questionnaires</td><td>CO1 to CO5
Effectiveness of Delivery of instructions & Assessment Methods</td></tr>
</table>

E. 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

1. Inner title page 2. Abstract or Synopsis 3. Acknowledgments 4. Table of Contents 5. List of table & figures (optional)	Usually numbered in roman

Chapters(to be numbered in Arabic) containing Introduction-, which usually specifies the scope of work and its importance and relation to previous worked 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

CIE ASSESSMENT FOR FINAL REVIEW

1.	Literature Review	05 mark
2.	Plan and schedule of Fabrication of the model /Data collection/repair and Overhauling work /creation.	10mark
3.	Results & Discussion	05 mark
4.	Presentation.	05 mark
	Total:	**25 marks**

SEE ASSESSMENT:

1.	Literature Review	05 mark
2.	Fabrication of the model/Data collection/repair and Overhauling work/creation	25 mark
3.	Results & Discussion	05 mark
4.	Presentation and Demonstration	10 mark
	TOTAL	**50 mark**

MODEL OF RUBRICS FOR ASSESSING REVIEWS OF PROJECT FOR CIE

RUBRICS MODEL

Student Name:				Reg NO:		
RUBRICS FOR ACTIVITY(5 Marks)						
Dimension	**Unsatisfactory**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1 Mark	**2 Mark**	**3 Mark**	**4 Mark**	**5 Mark**	
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	Ex: 4
Fulfill 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	5
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.	3
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	2
Average / Total marks=(4+5+3+2)/4=14/4=3.5=4						

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (Course Coordinator) for assessing the given activity.

APPENDIX 1 (Cover page)

(A typical Specimen of Cover Page)<Font Style Times New Roman – Bold>

TITLE OF PROJECT REPORT

<Font Size 18><1.5 line spacing>

A PROJECT REPORT

<Font Size 14>

Submitted by

<Font Size 14><Italic>

NAME OF THE CANDIDATE(S)

<Font Size 16>

in partial fulfilment for the award of the diploma

of

<Font Size 14><1.5 line spacing><Italic>

DIPLOMA IN MECHANICAL ENGINEERING PROGRAMME

<Font Size 16>

IN

DEPARTMENT OF MECHANICAL ENGINEERING

<Font Size 14>

LOGO

NAME OF THE COLLEGE

<Font Size 14>

DEPARTMENT OF TECHNICAL EDUCATION

BENGALURU-560001

<Font Size 16><1.5 line spacing>

Year of submission: (MONTH & YEAR)

<Font Size 14>

APPENDIX 2 (Title page)

(A typical Specimen of Title Page) <Font Style Times New Roman – Bold>

A Project Report
on

<TITLE OF THE PROJECT WORK>

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

DIPLOMA IN AUTOMOBILE 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 AUTOMOBILE ENGINEERING
GPT, Place--------

Department of Mechanical Engineering
<<NAME OF INSTITUTE>>
<<ADDRESS OF INSTITUTE>>

(A typical specimen of Bonafide Certificate)
<Font Style Times New Roman>

DEPARTMENT OF TECHNICAL EDUCATION BENGALURU-560001

<Font Style Times New Roman – size -18>

BONAFIDE CERTIFICATE

<Font Style Times New Roman – size -16>

<Font Style Times New Roman – size -14>

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

<<Name>>

HEAD OF THE DEPARTMENT

<<Department>>

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

<<Signature of the Project cordinator>>

SIGNATURE

<<Name>>

PROJECT CORDINATOR

<<Academic Designation>>

Department of Mechanical Engineering

<<Full address of the Dept & College

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 of ……in 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													
		WEAKS	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14
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																		
10	Review of Project work by guide	Students																		
11	Project report submission	Students/ Guide																		