

GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2023 (COGC-2023) Semester-VI

Course Title: Mechanical Engineering Project-II (Course Code: 4361904)

Diploma program in which this course is offered	Semester in which offered
Mechanical Engineering	6 th Semester

1. RATIONALE

This course curriculum is in continuation with course code: 4351904, Mechanical Engineering Project-I. This course enables the students to exercise some of the knowledge and/or skills developed during the Diploma study; to solve at-least one of the selected problem; for which there may be number of approaches. This course include planning of the tasks which are to be completed within the time allocated, and in turn, helps to develop ability to plan, use, monitor and control resources sustainably, optimally and economically. Abilities like creativity, imitativeness and performance qualities are also developed in students. Leadership development and supervision skills are also integrated objectives of learning this course.

2. COMPETENCY

The course content should be taught and implemented to develop different skills so that students can acquire the following competency.

- Providing safer, qualitative and/or sustainable solution of the problem by optimal usage of the resources.

3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge, and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

CO	CO Statement
CO-1	Plan and execute group's work allocation.
CO-2	Manage for raw-materials, bought-out parts, out-sourcing and/or manufacturing.
CO-3	Manufacture / manage project parts, assemble the project and test its performance.
CO-4	Calculate project cost.
CO-5	Prepare Mechanical Engineering Project-II report and present the same.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	CA	ESE	CA	ESE	
0	0	4	2	0	0	50	50	100

Legends: L-Lecture; T- Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, CA -Continuous Assessment; ESE-End Semester Examination.

5. SUGGESTED PRACTICAL EXERCISES

Following practical outcomes (PrOs) are the subcomponents of the Course Outcomes (COs). Some POs marked '*' are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to the 'Psychomotor Domain.'

Pr. No.	Practical Outcomes (PrOs)	Approx. Hrs.
01	<p>Group's work allocation:</p> <p>a. Refer group's project report selected for the course Mechanical Engineering Project-I and prepare group work allocation matrix for the entire term duration, as suggested in Annexure-I.</p> <p>b. Execute and update the said plan.</p> <p>Note: approximately equal work should be assigned per week, to each member for the entire term span.</p>	04
02	<p>Schedule resources requirement:</p> <p>a. Prepare various schedules of resources requirement like raw-materials, bought-out parts, and manufacturing facilities etc. and manage for the required resources.</p>	04
03	<p>Manufacture and test the project:</p> <p>a. Manufacture or manage for each project part.</p> <p>b. Assemble the project / product.</p> <p>c. Test its performance and maintain its record.</p>	36
04	<p>Project cost Calculation:</p> <p>a. Calculate the project cost.</p> <p>b. Prepare / update applicable documents as suggested in Exercise No. 4 of Mechanical Engineering Project-I</p>	04
05	<p>Documentation and presentation:</p> <p>a. Prepare a computerized project report as suggested in Exercise No.5 of Mechanical Engineering Project-I.</p> <p>Documentation of project report may includes following, in appropriate sequence.</p>	08

Pr. No.	Practical Outcomes (PrOs)	Approx. Hrs.
	<ul style="list-style-type: none"> a. Title page- b. Certificate – c. Index. d. Preface/Acknowledgement. e. Brief description of the Project. f. Updated specifications, assembly and detail production drawings. g. Work allocation matrix. h. Specifications of bought out parts. i. Process charts as per format given in course Industrial engineering; if required. j. Specification and consumption of consumables. k. Report of inspection / tests carried out. l. Details of rework / rectifications carried out. m. Cost Calculation. n. Notes on troubleshooting. o. Notes on individual achievement of skills / experience /problems / solutions. p. References. q. Day to day logbook of individual student work. r. Presentation including moments at work-video/photographs in action. <p>Note:</p> <ul style="list-style-type: none"> 1. Each project group will present their work after completion of each exercise as per department's plan. 2. Projects may be showcased in Institutional/regional level events. 	
Total (Hours)		56

Note:

- a. Term work (hard copy) should also include experience logbook duly certified by workshop instructors (as applicable), Industry/Market/Field personnel (as applicable) and Guide / Mentor.
- b. Term work has to be defended (along with term work of semester V and semester VI) by practical / oral examination to be conducted by external and internal examiners. Power point presentation is also to be included.

6. Sample rubrics Performance Indicators for the PrOs

Criteria	%	4	3	2	1
Logbook	10%	Always maintains proper order of meetings and assigned tasks	Consistently maintains proper order of meetings and assigned tasks	Sometimes maintains proper order of meetings and assigned tasks	Rarely maintains proper order of meetings and assigned tasks
Conclusion, Future Scope	10%	Conclusion derived appropriately	Conclusion derived but partial	Not relevant conclusion	No conclusion
Report write-up	10%	Always preparer basic category/section and summary	Consistently preparer basic category/section and summary	Sometime preparer basic category/section and summary	Rarely preparer basic category/section and summary
Oral Presentation	10%	Always discuss all contain with outline and methodology used	Consistently discuss all contain with outline and methodology used	Sometime discuss all contain with outline and methodology used	Rarely discuss all contain with outline and methodology used
Cost Calculation	10%	Always list parts used assembly and costing with competitive rates	Consistently list parts used assembly and costing with competitive rates	Sometime list parts used assembly and costing with competitive rates	Rarely list parts used assembly and costing with competitive rates
Work allocation	10%	Work Distribute Satisfactory & Corporate Team	60-79 % corporate to team	40-59 % corporate to team	Do not corporate to team
Part Manufacturing	15%	Contribute in part manufacturing	60-79 % Contribute in part manufacturing	40-59 % Contribute in part manufacturing	No Contribute in part manufacturing
Assembly	10%	Satisfactory assemble all part	60-79 % assemble all part	40-59 % assemble all part	Not assemble any part
Testing Result	15%	Satisfactory test the result	60-79 % test the result	40-59 % test the result	Not test any result

7. MAJOR EQUIPMENT/INSTRUMENTS REQUIRED

Sr. No.	Equipment Name	PrO. No.
1.	Basic manufacturing and inspection/test facilities as per individual project requirement	3
2.	Computer with word processor software	5

8. AFFECTIVE DOMAIN OUTCOMES

The following *sample* Affective Domain Outcomes (ADOs) are embedded in many of the above COs and PrOs. More can be added to fulfill the development of this course competency.

- Work as a leader/team member.
- Follow safety practices.
- Follow ethical practices
- Maintain tools and equipment
- Practice environment-friendly methods and processes.(Environment Related)

9. PO-COMPETENCY-CO MAPPING

Semester VI	POs						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Competency & Course Outcomes	Basic & Discipline-specific knowledge	Problem Analysis	Design/development of solutions	Engineering Tools, Experimentation & Testing	Engineering practices for society & sustainability & environment	Project Management	Life-long Learning
Competency	Apply systematic approach for problem identification and its selection; to provide qualitative, cost effective, sustainable solution for the selected problem.						
Plan and execute group's work allocation.	3	-	-	2	-	3	3
Manage for raw-materials, bought-out parts, out-sourcing and/or manufacturing.	3	2	-	-	3	3	3
Manufacture / manage project parts, assemble the project and test its performance.	3	3	3	3	-	3	3
Calculate project cost.	2	-	-	2	-	2	2
Prepare Mechanical Engineering Project-II report and present the same.	2	-	-	2	-	-	2

Legend: '3' for high, '2' for medium, '1' for low, and '-' for no correlation each CO with PO.

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE (GTU Resource Persons)

Sr. No.	Name and Designation	Institute	Contact No.	Email
1.	Jitendra P Parmar, Lecturer Mechanical Engineering	609 - C U Shah Polytechnic Surendranagar	9429942662	jpparmar66@gmail.com
2.	Muhammad Azharuddin U Badi, Lecturer Mechanical Engineering	627 - Government Polytechnic, Porbandar	9558800951	muhammadabadi92@gmail.com

11. BOS Resource Persons

Sr. No.	Name and Designation	Institute	Contact No.	Email
1	Dr. S. H. Sundarani, BOS Chairman & HOD Mechanical	Government Polytechnic, Ahmadabad	9227200147	gpasiraj@gmail.com
2	Dr. Rakesh D. Patel, BOS Member & HOD Mechanical	B. & B. Institute of Technology, V. V. Nagar	9825523982	rakeshgtu@gmail.com
3.	Dr. Atul S. Shah, BOS Member & Principal	B. V. Patel Institute of Technology, Bardoli	7567421337	asshah97@yahoo.in

ANNEXURE-I

SAMPLE WORK ALLOCATION MATRIX

Enrol.No:

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NAME :-

GROUP:-

Sr No	Short Description of Activity	Who Will Perform?	Planned Date		Actual Date		Who Has /Have Performed	Reason/s for Any delay; if any	Sign of Guide
			Start	End	Start	End			
1.	Preparing and maintaining logbook as per Annexure-V.								
2.	Finalization of assembly and detail drawings (This must be production drawings with suitable scale along with dimensions, tolerances, surface roughness symbols, heat treatment / other treatments required, material, quantity per assembly for components drawings, etc.								
3.	Preparing master schedule and work allocation matrix in group.								
4.	Preparation of bill of material.								
5.	Collecting data and specifications of available resources-mainly material and machineries / equipment / facilities and tools.								
6.	Make or Buy decision.								
7.	Preparing specifications of bought-out parts.								
8.	Preparation of process planning (sheets) for all components in standard format.								
9.	List, quantities and specifications of consumables.								
10.	Preparation of list of required tools cutting tools, jigs, fixtures, measuring instruments and other tools along with necessary specifications and sketches if required.								
11.	Identifying and locating required resources like material, machineries / equipments / facilities and								

Sr No	Short Description of Activity	Who Will Perform?	Planned Date		Actual Date		Who Has /Have Performed	Reason/s for Any delay; if any	Sign of Guide
			Start	End	Start	End			
	tools.								
12.	Preparing plant layout.								
13.	Manufacturing of components.								
	a. <name of component 1 >								
	b. <name of component 2 >								
	d. <name of component 3 >								
	e. ..								
	n. <name of component n >								
14.	Details of inspection carried out.								
15.	Assembly.								
16.	Details of testing carried out.								
17.	Rework / rectification activities if required.								
18.	Costing.								
19.	Preparation of notes on troubleshooting.								
20.	Preparation of notes individually on								
	a. Extent to which he/she has achieved learning outcomes.								
	b. Own experience in executing project. c. He/ She has faced technical problems during execution of project and solutions found.								
21.	Preparation of list of references.								
22.	Preparation of project-II report.								
23.	Presentation.								