GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

METALLURGY ENGINEERING PROJECT
[CODE: 4362104]

Diploma Programme in which this course is offered	Semester in which offered
Metallurgy Engineering	6TH Semester

1. RATIONALE

Project work serves as a means for students to utilize their coursework knowledge and skills to solve particular problems or execute projects, ultimately fostering innovative skills. In addition, Developing a plant for a metallurgical product is a complex task that requires a comprehensive report encompassing various aspects such as the metallurgical process and unit operations, properties of raw materials and products, economic factors, safety and pollution issues, and material and energy consumption. Metallurgy engineering students need to prepare such reports to become successful entrepreneurs while keeping in mind sustainability factors.

The wide range of sustainable metallurgical products can be chosen from different sectors, including foundry, iron and steel making plant, pharmaceuticals, pesticides, natural products, polymers, and dyes. Careful consideration must be given to major equipment specifications, plant layout, and location to ensure the sustainability and success of the project.The syllabus provided is a guide, and instructors have the option to motivate students to develop prototypes, conduct experiments, or generate novel ideas that spark innovation.

2. COMPETENCY

The course should be taught and curriculum should be implemented with the aim to develop required skills so that students are able to acquire following competency:

- **Identifying a Metallurgical product, evaluating its essential features and characteristics, understanding the manufacturing processes involved, and selecting appropriate Process, equipment and instruments for the production.**

3. COURSE OUTCOMES (COs)

At the end of the study of this course the student will be able to:

CO.1: Engage in independent and group study to research literature in the identified domain.

CO.2: Use the selected engineering tool/component for solving the identified engineering problem.

CO.3: Engage in effective written and oral communication through the project report and presentation of the project respectively.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
0	0	8	4	0	0	100	100	200

(*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessing the attainment of the cognitive domain UOs required for the attainment of the COs.

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

5. COURSE DETAIL

The project is offered to the students of 6th semester in order to inculcate innovation and attitude to develop skills. A group of students (according to project work) work as a team for project work.
The project should be selected such that it could be completed within academic term.

Project work should be distributed in three phases

1. Shodh Yatra:- Identify the Project topics after 5th semester
2. Project proposal :- Submission of project proposal against department PRC (Project Review Committee) at the commencement of 6th semester
3. Report Submission: Final project report submission at the end of semester.

GUIDELINE FOR THE PROJECT WORK FOR DIPLOMA ENGINEERING

Each Project will be completed throughout academic term of 6th Semesters

Project 6th Semester (Total Marks: 200)

- Out of 200 marks, 100 marks are to be given as Practical Internal as per scheme suggested the college,

through Internal Assessment. In which included, problem definition, project objective and work has been carried out and report submission accordingly.

- The remaining 100 marks are for the Practical Viva as an External which shall be conducted by the GTU.
- Each defined project needs to be from Industry/Research organization/Govt. organization/ socio-technical issues and according to the need of time for solving real life problems.
- There should be one Project Review Committee(PRC) in consists of following members
  a) Head of Department (HOD)
  b) Project Coordinator from Department
  c) Internal faculty/Industry resource person

6. PROJECT GUIDELINE FOR STUDENTS

- Project identification should be based on "Shodh-Yatra" carried out by the students, after 5th Semester exam. The "Shodh Yatra" should be completed by the end of the first week from the commencement of the 6th semester.
- Students may reefer the curriculum for selection of provisional topics of projects
- Students may consult the faculties of their choice of Metallurgy Engineering for finalize the topic.
- Problem definition for the project needs to be submitted by every student/group of students within prescribed time limit against PRC. There should be one presentation of project proposals against PRC.
- After approval student should assign to the project guide/supervisor in the beginning of 6th semester and students may work on areas approved under the supervision of allotted supervisor.
- There are two project review presentation during the semester against PRC. One for finalizing project proposal and literature review and one at the mid of the semester. The suggestions given by PRC have to be incorporated before completing the project.
- Students may have to produce their progress periodically to their supervisor as per directions given by supervisor.
- Students may submit their final project report duly signed/approved by their supervisor to the department at the end of semester.
- Real time problems, Industry related problems, and environment friendly problems should be chosen as a final year project.
- **Identification of Topic**: The selection of topic is of crucial importance. It should be decided based on understanding of the study, in the field and interest. The topic should be discussed with the project supervisor. It should be in harmony with areas of interest and the specialization of the project supervisor.
- Students are advised to select project supervisor who are active professionals in the relevant area of the selected topic.
- The internal assessment marks will be evaluated based on progressive evaluation and oral presentation by the internal supervisor

7. PROJECT ALLOCATION POLICY

- Students may have to submit their project proposal/ research interest with proposed supervisor if they have consulted to PRC within a week from commencement of 6^{TH} semester.
- There should be intermediate power point presentation against PRC.
- PRC will access the proposal received by the students group and then finalize their titles/research areas and allocate them supervisor.
- The groups of students have to work under guidance of their allocated supervisor.

8. TYPES OF PROJECT

The following types of project may be allocate to students:

a. Field study (empirical study).
b. Statistical and case studies
c. Experimental investigation,
d. Computational work,
e. Data collection and its analysis,
f. Design oriented.
g. Comprehensive case study (problem formulation, analysis and recommendations),
h. Comparison of practices/ validation of theory/ method of testing, survey of quality Management practices

The project should be challenging but manageable within the resources and time available and it should be helpful to society.

9. ROLE OF PROJECT REVIEW COMMITTEE

- There should be one Project Review Committee(PRC),which consists of following members
  (1) Head of Department (HOD)
  (2) Faculty member from the department-Project In charge
  (3) Internal faculty/Industry resource person

- PRC will arrange two reviews for the project in semester
  (1) 1ST review for finalizing project titles/proposals and allotment of supervisor foreach group of students
  (2) 2ND review included mid-term review assessment.

The PRC will give suggestions for quality improvement of each project.

10. ROLE OF SUPERVISOR/GUIDE

- The supervisor will supervise/guide the group of students throughout the semester.
- Supervisor will assess the students individually as per stipulated assessment guidelines and recordkeeping.
- Suggest resources to the students.
- Guide students on how to address issues on environmental and sustainability. Environment friendly projects will be given priority.
- Motivate continuously students throughout project work.

11. ASSESSMENT CRITERIA FOR EFFECTIVE EVALUATION OF THE PROJECT

Sr. No.	Description	Weightage
1	Identification of problem and Framing of Problem Statement	10%
2	Problem Analysis	10%
3	Feasibility of proposed solution	10%
4	Adherence to Action plan	10%
5	Content appropriateness	10%
6	Technical knowledge and awareness related to the project	15%
7	Project Report	15%
8	Presentation	10%
9	Question-Answer Technique	10%
	TOTAL MARKS	**100**

* Assessment weightage may vary according to project type.

12. PO-COMPETENCY-CO MAPPING

Semester I	**FUEL, FURNACES AND REFRACTORIES (Course Code:** 4332104**)**						
	POs and PSOs						
Competency & Course Outcomes	**PO 1 Basic & Discipline specific knowledge**	**PO 2 Problem Analysis**	**PO 3 Design/ development of solutions**	**PO 4 Engineering Tools, Experimentation & Testing**	**PO 5 Engineering practices for society, sustainability & environment**	**PO 6 Project Management**	**PO 7 Life-long learning**
CO.1: Engage in independent and group study to research literature in the identified domain.	3	3	2	1	2	3	2
CO.2: Use the selected engineering tool/component for solving the identified engineering problem.	3	1	1	3	2	3	1

CO.3: Engage in effective written and oral communication through the project report and presentation of the project respectively.	-	-	-	-	-	3	1

- Legend: '**3**' for high, '**2**' for medium, '**1**' for low or '**-**' for the relevant correlation of each competency, CO, with PO/ PSO

13. SAMPLE EVALUATION RUBRICS

Parameters	**>70% (Attainment Level 3)**	**40-70% (Attainment Level 2)**	**<40% (Attainment Level 1)**
Literature Survey	Referred to more than FIVE articles; appropriately summarized; includes recent references	Referred to more than TWO articles; appropriately summarized; NO recent references	NO references included
Problem statement	Problem statement is clear, can be implemented and tested, and addresses one of the Engineering Challenge	Problem statement clear, NOT feasible for implementation, and does NOT address the Engineering Challenge	Problem statement NOT clear
Contribution to society, concern for environment	The community that shall benefit clearly specified; ensures safety to environment	Community clearly specified; however safety measures not specified	Hazard to society and to environment
Project Scheduling and work delegation	Proposed and implemented Gantt chart included; with clear distribution of workload among the team members	Proposed Gantt chart included; without clear distribution of workload	Gantt chart NOT provided; NO distribution of workload
Preparing the equipment/ component list	An Exhaustive list of possible Modern Tools/Components that may be used to implement the project is provided, together with a brief comparative study	A list of possible Modern Tools/Components that may be used to implement the project is provided, without the brief comparative study	Only list of modern tool(s) and components being used is provided
Design(s)	More than ONE design solution provided and implemented, with a comparative study	Only ONE design solution implemented	NO design included
Analyze the results	Included clear analysis, along with advantages and disadvantages	Included analysis, without the advantages and disadvantages	NO analysis
The Project Report	well organized, clear objectives and outcomes for every chapter	NOT well organized	NOT submitted by the deadline
Oral Presentation	well organized, clear	Slides are not well	Poor organization, ALL

	presentation, all members have equal participation	organized, presentation not clear	members do not have a role
Viva-Voce or or Q & A	Fair knowledge of MOST concepts related to the project	Demonstrates fair knowledge of SOME concepts	NO knowledge of any of the concepts
Performance in the Team	Contributes to the team, cooperates in the team, and mentors/leads the team	cooperates in the team, but does NOT contribute to the team	Does NOT cooperate in the team

14. ARRANGEMENT OF CONTENT IN PROJECT REPORT

The sequence in which the project report material should be arranged as follows:

1) Cover Page
2) Title Page
3) Certificate
4) Abstract
5) Table of Contents
6) List of Tables
7) List of Figures
8) List of Abbreviations and Nomenclature
9) Chapters
   i. Introduction
   ii. Literature Survey/Review of Literature
   iii. Define the problem.
   iv. Experimental work
   v. Analysis/Results and Discussions
   vi. Conclusions
   vii. Future scope of work
10) References
11) Appendices

Each chapter should be given an appropriate title. Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited. Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

ARRANGEMENT OF PARAGRAPH IN A CHAPTER:

- Each paragraph in a chapter should be properly numbered for example, 1.1, 1.2 etc., where first digit represents the Chapter Number and second digit the paragraph number. There is no need to indicate the number for the first paragraph in a chapter.
- Sub-paragraphs, if any indicated as 1.1.1, 1.1.2 etc. i.e. first digit representing thechapter, the second representing the paragraph and third representing the sub- paragraph.
- **Don't underline the headings or subheadings or side heading**. Instead use the boldletters.

APPENDICES:

- Appendix showing the detailed data, design calculations, derivation etc
- Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme.
- Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc. Appendices, Tables and References appearing in appendices should be numbered and referred to as appropriate places just as in the case of chapters.
- Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.

LIST OF REFERENCES:

- References should be numbered from 1st chapter to the last chapter in ascending order and should be shown in square brackets.
- The bibliography list should be made strictly in alphabetical order of the name of the authors
- The listing of references should be typed 4 spaces below the heading
- References in alphabetical order in single spacing left – justified.
- The reference material should be listed in the alphabetical order of the first author.
- The name of the author/authors should be immediately followed by the year and other details.
- A typical illustrative list given below relates to the citation example quoted above.

[Chapter]Author Name, „Title of the book or paper‟, Publisher name, (year), Page No

References:

1. Ariponnammal, S. and Natarajan, S. ‘Transport Phonomena of SmSel – X Asx’,Pramana (1994) Journal of Physics Vol.42, No.1, pp.421-425.

TABLE AND FIGURES:

- In the references by the word Table, is meant tabulated numerical data in the body ofthe project report as well as in the appendices.
- All other non-verbal materials used in the body of the project work and appendicessuch as charts, maps, photographs and diagrams may be considered as figures.

TYPING INSTRUCTIONS:

- The impression on the typed copies should be black in colour.
- The project report should be submitted in **A4** size (29 cm x 20 cm).
- Good quality or Bond paper should be used for the preparation of the project report.
- Typing should be done on one side of the paper with character font in **size 12** of **TimesNew Roman.**
- 1.5 line spacing should be used for typing the general text.
- Subheading should be typed in bold Font size 12 and heading bold Font size 14.
- The layout should provide a margin of 1.50 Inches on the left, 1.00 Inches on the top,bottom and right.
- The page numbers should be indicated at the top-middle or bottom-middle of theeach page.

- Heading s should be in bold should not underline the heading/subheadings and shouldnot put colons (:) in headings or subheadings.

15. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Sr.	Name and Designation	Institute	Contact Detail
1	**Dr. Vishal N. Kaila** Lecturer, Metallurgy Engineering	Government Polytechnic, Rajkot	vnk.met@gmail.com
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