GUJARAT TECHNOLOGICAL UNIVERSITY

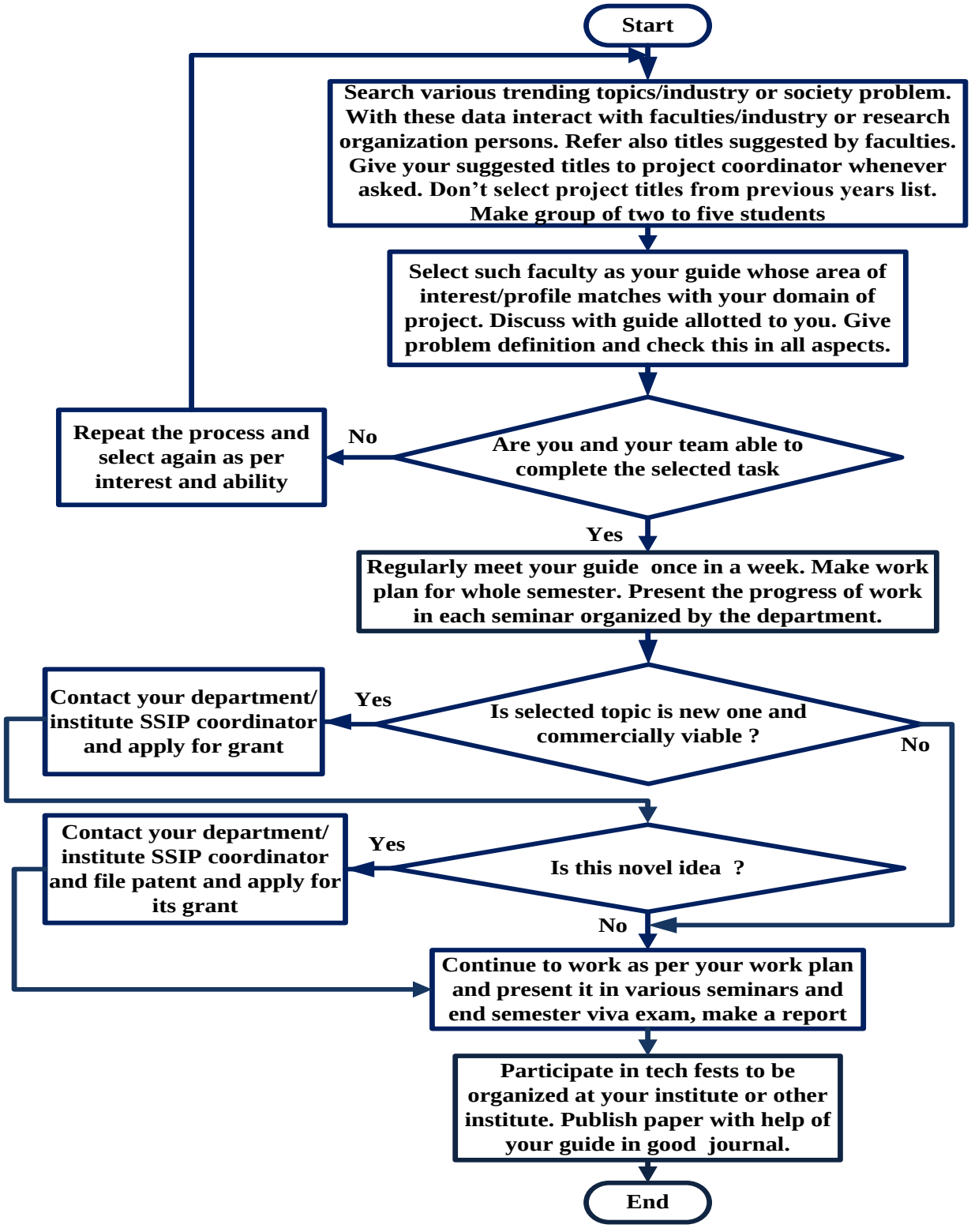
Program Name: Diploma Engineering
Level: Diploma
Branch: All Branches
Subject Code: DI05000341
Subject Name: Minor Project

w. e. f. Academic Year:	2026-27
Semester:	5th
Category of the Course:	**Minor Project**

Prerequisite:	Basic knowledge of all subjects studied up to the 4th semester
Rationale:	The course **"Minor Project"** is designed to enable students to keep pace with future technological changes and to acquire knowledge and skills as and when required. It aims to provide students with a virtual industrial experience. The course covers problem identification, exploration of alternative solutions, selection of the most appropriate method, choice of suitable equipment and components, selection of a project guide, and preparation of a work plan to complete the project within the stipulated time. Four seminars are included to develop students' communication skills and to assess the progress of their work. The course also promotes a holistic student-entrepreneurship approach, including startup initiation, grant funding, and patent protection, in alignment with India's self-reliance mission. It is compulsory to develop a working model for the project.

Project identification and guide allocation:

- Students shall first form a group and select proposed project titles based on their interests. For this, they should explore relevant websites, visit industries, refer to journals and books, and discuss ideas with faculty members. The Project Coordinator may collect the proposed project titles from both students and faculty members. These titles should not duplicate any project titles offered in the past three years.
- A faculty member whose expertise and area of interest align with the selected topic should be considered the most suitable guide for the group.
- Before the commencement of the fifth semester, a project orientation should be conducted annually by the Project Coordinator to discuss topic selection, team formation, and guide allocation.
- A list of guides, along with their domains of expertise and areas of interest, should be provided to the students.
- This list should also be uploaded to the departmental or institutional website.
- Students should be allowed to choose a guide whose area of interest matches their project domain. The project title selection process and related activities are summarized in the following flowchart.


Start
Search various trending topics/industry or society problem. With these data interact with faculties/industry or research organization persons. Refer also titles suggested by faculties. Give your suggested titles to project coordinator whenever asked. Don't select project titles from previous years list. Make group of two to five students
Select such faculty as your guide whose area of interest/profile matches with your domain of project. Discuss with guide allotted to you. Give problem definition and check this in all aspects.
Are you and your team able to complete the selected task
No
Repeat the process and select again as per interest and ability
Yes
Regularly meet your guide once in a week. Make work plan for whole semester. Present the progress of work in each seminar organized by the department.
Is selected topic is new one and commercially viable ?
Yes
Contact your department/ institute SSIP coordinator and apply for grant
No
Is this novel idea ?
Yes
Contact your department/ institute SSIP coordinator and file patent and apply for its grant
No
Continue to work as per your work plan and present it in various seminars and end semester viva exam, make a report
Participate in tech fests to be organized at your institute or other institute. Publish paper with help of your guide in good journal.
End

Suggested Activities for Students

1. Interact with the institute guide and, if required, with personnel from industry or research organizations.
2. Select a focused project title.
3. Gather and organize information systematically (literature survey).
4. Define, explain, and submit the problem statement.
5. Seek guidance from the guide and provide regular progress updates.
6. Conceive and draw the general block diagram of the selected project.
7. Develop detailed diagrams or circuit diagrams.
8. Write the algorithm and draw a flowchart (especially for microprocessor-, microcontroller-, or software-based projects).
9. Simulate the circuit or system, if required.
10. Prepare the project report (as per the format provided by the department).
11. Prepare a PowerPoint presentation for seminars and the final presentation, which will be conducted for progressive assessment.
12. If the project is innovative, explore grant opportunities for startup support.
13. With the help of the SSIP Coordinator, examine intellectual property rights for possible patenting of the project.
14. Participate in project competitions at the institute, inter-college, or university level.
15. Participate in hackathons at the state or national level to further develop and showcase the project.

Competency

The course content shall be taught and implemented with the objective of developing diverse skills so that students acquire the following competencies:

1. To develop inquisitiveness, innovative skills, and confidence to work independently.
2. To participate effectively in group work.
3. To collect relevant data.
4. To plan and organize the work.
5. To analyze and synthesize the data.
6. To integrate knowledge of various courses to address a selected problem.
7. To make appropriate decisions whenever required.
8. To conduct surveys and investigations.
9. To solve industry-related problems.
10. To optimize the project cost.
11. To design the layout as per requirements.

12. To prepare block diagrams, circuit diagrams, simulation models, and microcontroller programs as required.
13. To assess the financial implications and feasibility of the project.
14. To troubleshoot faults during assembly and testing.
15. To modify the component/system whenever required.
16. To prepare technical reports and presentations.
17. To present the work individually and as a team.
18. To publish a paper in a reputed journal/conference based on the work.
19. To prepare a comprehensive plan for startup grants and consult the SSIP coordinator/patent attorney to assess patent eligibility of the project work.

Course Outcomes: After Completion of the Course, Student will be able to:

No	Course Outcomes	RBT Level*
01	Review the existing literature/system to identify problems in the current system	R, A
02	Select the most appropriate solution to the defined problem, considering budget and design methodology to achieve the final outcome.	U, A
03	Initiate project development by procuring components/data, assembling or implementing the system, and conducting testing.	A
04	Modify project components or redesign, if required, based on testing results and performance evaluation.	A
05	Defend the final review with the developed hardware/software/application, along with report writing and presentation individually and as a team.	R, A

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA(M)	PA(I)	ESE (V)	
0	0	6	3	0	0	50	50	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Unit 1 **Review the existing literature/system to identify problems in the current system** 1.1 To select the appropriate project title, survey different types of research papers, books and websites. Do industry visits if necessary. 1.2 Identify the problem related to the specific branch of Diploma Engineering. 1.3 Identify and gather the information related to the selected problem. 1.4 From the gathered information (and with the help of guide) make appropriate problem statement and abstract.	12	14%
2	Unit 2 **Select the most appropriate solution to the defined problem, considering budget and design methodology to achieve the final outcome** 2.1 Collect relevant data for the selected problem from various sources. 2.2 Analyze the collected data to understand the problem and identify possible solutions. 2.3 Where required, use charts, graphs, or simulations to evaluate suitable methods. 2.4 Compare different methods for solving the selected problem. 2.5 If the chosen solution is not effective (based on feedback from the guide or industry mentor), consider an alternative approach. 2.6 Assess the financial implications and feasibility of different solutions based on preliminary analysis. 2.7 Evaluate and compare possible methods, considering their financial viability. 2.8 Select appropriate machines, equipment, instruments, or software for the solution. 2.9 Ensure safety considerations are prioritized while planning the work. 2.10 Seek continuous guidance from the institute guide, industry mentor, or other relevant experts. 2.11 Prepare a structured work plan for the project.	18	20%
3	Unit 3 **Initiate project development by procuring components/data, assembling or implementing the system, and conducting testing** 3.1 Select components and equipment as per the required specifications.	20	22%

	3.2 Prepare a cost estimate for the project 3.3 Distribute tasks among group members according to their skills. 3.4 Work consistently to achieve the project targets. 3.5 Test and analyze the hardware after loading the software (if a microcontroller is used). 3.6 Verify and modify the microcontroller program, if necessary. 3.7 Complete the remaining fabrication, soldering, and wiring after testing.		
4	Unit 4 **Modify project components or redesign, if required, based on testing results and performance evaluation** 4.1 Design the final layout. 4.2 Arrange different sections or parts logically and appropriately. 4.3 Fabricate and construct the final model as per industry standards, if possible. 4.4 Modify components, if necessary, based on observations from earlier stages. 4.5 Modify the microcontroller program, if required, based on earlier findings	20	22%
5	Unit 5 **Defend the final review with the developed hardware/software/application, along with report writing and presentation individually and as a team** 5.1 After task allocation, each student should work independently to complete assigned tasks within the stipulated time. 5.2 Prepare the project report as per the format provided by the Project Coordinator. 5.3 Prepare a Power Point presentation and present it as per the schedule. 5.4 Reflect on the experiences gained during the project work in the report and presentation. 5.5 Students may seek guidance from relevant experts; such contributions should be duly acknowledged in the report and presentation. 5.6 Incorporate suggestions provided by the guide or evaluation team during earlier seminars or meetings. 5.7 Respond confidently to questions during seminars.	20	22%
Total		**90**	**100%**

Scope of Projects

Scope of the project work should be decided based on following criteria:

(i) Relation to diploma programme curriculum: When student intend to select topics for the project work, they need to choose a project which relates well to their curriculum (it may be beyond their curriculum but it should relate to it) and requires implementation of theories already learnt and skills already possessed by them from the previous semesters.

(ii) Abilities possessed by the group of students: Projects should be chosen so that it can be completed mainly using students' problem-solving capabilities and depth of learning. It is natural that highly motivated students or high achievers may come out with projects which are more complex andchallenging. Teachers should guide students to choose challenging projects according to the student's ability.

(iii) Resources available: Students and Guides should keep in mind the availability of resources while deciding the topic and the scope of the project. Some of the important resources which need consideration are:

- Time available
- Raw material/components required
- Manufacturing/fabrication equipment and tools required
- Testing/Measuring equipment and instruments required
- Access to journals (library/digital)
- Expertise for theoretical guidance available in college (or nearby Institutions or nearby industries)
- Expertise and Technology required for fabrication (if required)
- Software required

Types of Projects: In general, the projects are of the following types:

(i) Design projects
(ii) Prototype (design, make, test and evaluate)
(iii) Advanced experimental work requiring the development of existing equipment to be need and developed considering impact on environment
(iv) Field works: This could include surveys, using equipment, charting data and information from virtual observation.
(v) Application of emerging technology: Theoretical study of some emerging technology and feasibility of its application in some real-life situation in detail.
(vi) Fabrication of some equipment/ machine etc.
(vii) Development of software/ application to solve some complex problem related to different engineering field.

Role of Guide:

- The guide will supervise and mentor the group of students throughout the semester.

- The guide will assess the students individually as per the stipulated assessment guidelines and maintain records.
- Suggest relevant resources to the students.
- Guide students in addressing issues related to the environment, sustainability, and other relevant concerns.
- Continuously motivate students throughout the project work.

Role of the Project Evaluation Committee

There shall be one Project Evaluation Committee consisting of the Program Coordinator, Senior Lecturers and/or the Head of the Department (HoD). The Program Coordinator will arrange four review sessions for the Minor Project in the fifth semester on behalf of the committee. The committee, along with the project guide, will evaluate the work completed by each project group and award marks according to the rubrics designed for this course.

Assessment of Project Work

Project Guide and/or Program coordinator and/or Project Evaluation Committee will assess the project work in four different project seminars as per the assessment rubrics suggested here. Total four seminars are to be held during the fifth semester and continuous assessment (CA for 50 marks) is to be done as per the following suggested sheet. (Remaining 50 marks are for the end semester exam - ESE which shall be conducted by the GTU).

Evaluation of Minor Project

Serial No.	Students Name	Enrollment Number	Name of Guide	Project Title	Marks (Continuous Assessment)				
					Seminar-I (out of 10)	Seminar-II (out of 10)	Seminar-III (out of 10)	Final Evaluation (out of 20)	Total (out of 50)
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

(Sign) **(Sign)**

Project evaluation committee **Head of the Department**

Sample assessment rubrics to be used to verify the progressive work done by the student for different seminars and final evaluation of progressively work done by students.

Assessment Rubrics of Minor Project

Sr. No.	Activity	Criteria for performance	High Proficiency	Proficiency	Some Proficiency	No/Limited Proficiency	Score
			8 to 10 Marks	6 to 7 Marks	3 to 5 Marks	0 to 2 Marks	
1	Seminar-1	Literature Survey and Problem Identification	Student surveyed all the possible literatures/resources and states the problem clearly and identifies underlying issues	Student surveyed the possible literatures/resources and adequately defines the problem	Student surveyed less literatures/resources and fails to define the problem adequately	Student surveyed very less literatures/resources and Student does not identify the problem	Out of 10
2	Seminar-2	Approach to the solution with budget and developing a plan to solve the problem	Innovative approach with budget and Student developed a clear and capsized plan to solve the problem, with alternative strategies	Fairly good approach and Student developed an adequate plan	Simple approach and Student developed a marginal plan	No approach at all for solution of selected problem and Student did not develop a coherent plan to solve the problem	Out of 10

3	Seminar-3	Execute the testing of project after assembling of final hardware to verify the result and modify the components/software of the project whenever it is required	Started testing of project and verified the result and did all the possible tests and modified the components/software as per requirement	Started testing of project and verified some result and did all the possible tests and modified some components/ software as per requirement	Started testing of project and not verified the result and did all the possible tests and did not modify any components	No approach at all for testing of project as well as verification of results and did not perform any tests and did not modify any components	Out of 10
4	Seminar-4 (Final evaluation at the end of 5th semester)	Defend final review with hardware model/ software/ application, report writing, present as individual and	Student explained the work very effectively and confidently and successfully demonstrated the hardware/model/ software/ application	Student explained the work very effectively and confidently and demonstrated the hardware/model/ software/ application with less confidence	Student explained the work with less confidence and not able to demonstrate the hardware/model/ software/ application confidently	Student didn't explain the work effectively and confidently and not able to demonstrate the hardware/model/ software/ application confidently	Out of 20

		team.					
						Total	**Out of 50**

Software/Learning Websites

- https://www.electronicsforu.com/
- https://www.electrical4u.com/
- https://www.mathworks.com/
- https://www.arduino.cc/
- https://www.alldatasheet.com/
- https://www.allaboutcircuits.com/
- https://circuitglobe.com/
- https://www.electricaltechnology.org/
- www.vlab.co.in
- https://phet.colorado.edu/
- www.waterbouw.tudelft.nl/
- https://watersupply.gujarat.gov.in/
- https://guj-nwrws.gujarat.gov.in/
- https://vlab.amrita.edu/index.php?sub=1&brch=194
- https://virtuallabs.hkust.edu.hk/TubularHeatExchanger/VirtualExperiment
- https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=709&cnt=4
- https://www.spiraxsarco.com/resources-and-design-tools/steam-tables/superheated-steam-region
- https://www.geeksforgeeks.org/machine-learning/
- https://www.tutorialspoint.com/machine_learning_with_python/index.htm
- https://developer.android.com
- https://www.geeksforgeeks.org/android-tutorial
- https://www.tutorialspoint.com/android/index.htm
- https://printwiki.org/glossary
- http://agpcptech.weebly.com/ - notes

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