GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2021 (COGC-2023)

Semester-VI

Course Title: Major Project

(Course Code:4361704)

Diploma programmer in which this course is offered	Semester in which offered
Instrumentation and control	Sixth

1 RATIONALE:

The key focus of "Project" is to cultivate the crucial skill of "learning to learn" autonomously. This capability is deemed essential for students to adapt to evolving technological advancements and acquire knowledge and skills as needed. The project's course is intricately designed to fulfill these requirements. The overarching goal is to empower students to stay abreast of future changes and effectively navigate the dynamic landscape of technology and knowledge acquisition.

The Project is also included with Seminar with the aim to develop certain set communication skills (preparation of report, writing survey report writing lab. experiment results writing conclusions of the work done and physical phenomenon observed, participating in group discussions, verbally defending the project in the form of Seminar etc.)

The program is designed to equip students with knowledge and skills that align with current and future industry/user system requirements, fostering social awareness and professional attitudes. Students are expected to continuously update themselves in response to evolving technologies and user system needs. Emphasis is placed on cultivating an inquisitive attitude, instilling effective study and work habits, and nurturing overall personality development, including positive attitudes.

2. COMPETENCY:

The course should be facilitated and implemented, with the aim to develop Communicate and lead effectively as well as able to work independently but also collaboratively in multi disciplinary teams by acquiring following skills:

· **Hard Skills:** Planning, Interpret Technical Specifications, Designing, fabrication, Implementation, Testing, Installation.

· **Soft Skills**: Report writing, presentation, Software development/Programming · Interpersonal Skills: Team work, Communication, Coordination, awareness of market scenario such as costing of components/services.

3. COURSE OUTCOMES (COs):

CO1	Apply in totality the knowledge and skills gained through the course work in the solution of particular problem or by undertaking a project.
CO2	Develop understanding of subject based knowledge given in the classroom in the context of its application at work places.
CO3	Learn and adopt first-hand experience and confidence amongst the students to enable them to use and apply polytechnic/institute based knowledge and skills to solve practical problems related to the world of work.
CO4	Develop abilities like interpersonal skills, communication skills, positive attitudes and values etc.
CO5	Attain skill for writing technical report and prepare poster/ppt for presentation.

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	2	1	0	0	50	50	100

5. AFFECTIVE DOMAIN OUTCOMES:

The following affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs. More could be added to fulfill the development of this course competency.

a) Work as a leader/a team member as an Engineer.
b) Practice environmentally friendly methods and processes.
c) Follow safety precautions and ethical practices.

6. COURSE DETAILS

Students should carry out one project during the term related to Instrumentation Project may be pertaining to measurements of process variables and parameters, measurement, control and its interfacing with various Processors.

Guideline to form a group:

Students in group have to identify real life engineering problems from industry, academic institutions, or society. It is preferable to work in a group of minimum two students, (***Reason: every engineering activity is group activity)***. Each group can have a maximum four students if project complexity demands.

Guideline for selecting the project idea:

1. Students should read well known technical magazines such as electronics for you, elector-electronics; automate magazine, automation world, and instrument India etc.
2. Project volumes published by electronics for you magazine.
3. Students should refer to the resource web link given at last.
4. Students can choose real life based project.
5. Students can make market survey and got an idea of new startup project.

7. SUGGESTED PROJECT LIST

Following list of projects are suggested for the guidance of faculties and students:

Sr. No.	NAME OF PROJECTS	AREA OF PROJECTS
1.	Home Automation and Security Control Using Microcontroller	PROCESSOR BASED APPLICATION
2.	Remote controlled Stepper Motor Using Microcontroller	
3.	Ultrasonic Proximity Detector Using Microcontroller	
4.	RFID Based Device Control and Authentication Using PIC Microcontroller	
5.	Beacon Flasher Using Microcontroller	
6.	Line Following Robotic Vehicle Using Microcontroller	
7.	Water Level Controller using 8051 Microcontroller:	

8.	Smart Card for Entry Employee Using Microcontroller	
9.	Password Based Door Lock System Using 8051	
10.	Digital Tachometer Using 8051 Microcontroller	
11.	PLC Based Dc Servo Motor Control System	MEASUREMENTS OF PROCESS VARIABLES AND PARAMETERS AND INTERFACING WITH PLC AND SCADA MISCELLANEOUS.
12.	PLC based injection Moulding machine	
13.	PLC based automatic car washing machine	
14.	PLC based Elevator Controller	
15.	PLC based Temperature/Pressure Controller	
16.	Industrial Timer Controller for Multiple Machines using PLC	
17.	Sequential Batch Process using PLC	
18.	Automated Railway Signaling and Monitoring using PLC	
19.	PLC based Coffee Vending Machine	
20.	Automated Door open and close System using PLC	
21.	PLC based automatic bottle filling System	
22.	Water storage and distribution system for pharmaceuticals using PLC and SCADA	
23.	SCADA application of a water steam cycle of a thermal power plant	
24.	Microcontroller-Based Robotics and SCADA Experiments	
25.	SCADA And PLC Based Distribution and Substation Automation	
26.	SCADA System Design and Construction for Real Time Electrical Parameter Monitoring and Control	
27.	SCADA (Supervisory Control & Data Acquisition) for Remote Industrial Plant	
28.	Simulation approach on step speed control of Induction Motor using LabView	MEASUREMENTS OF PROCESS VARIABLES AND PARAMETERS AND INTERFACING *WITH COMPUTERS*
29.	Design & Implementation of Smart House Control Using Lab VIEW	
30.	Lab view-based instrumentation system for solar-wind hybrid station	
31.	Multi-Device control system using PC	
32.	PC based Temperature Control System	
33.	PC Based Motor Speed Monitoring System	
34.	Ethernet based home/industrial automation	
35.	PC based packing control machine for industrial Application	
36	Smart Home Automation System	IoT BASED PROJECT
37	IoT-based Weather Station	
38	Smart Agriculture System	

39	IoT-based Health Monitoring System	
40	Smart Parking System	
41	IoT-enabled Waste Management System	
42	Home Energy Management System	
43	IoT-based Smart Water Quality Monitoring	
44	Industrial IoT (IIoT) for Equipment Monitoring	
45	IoT-based Smart Traffic Light Control	
46	Smart Retail Shelf Monitoring	
47	IoT-based Fire Detection System	

8. Guideline for Report Writing

Every student has to submit their project work in detail in the project report both in hard copy as well as softcopy (preferable in CD media). Project report should be as per guideline given in the following table.

Chapter No.	Title	Remarks
-	Front page	Compulsory
-	Certificate	Compulsory
-	Acknowledgement	Compulsory
-	Table Of Content	Compulsory
1.	Brief description of project idea	Compulsory
2.	Literature survey	Optional
3.	Block diagram with description	Compulsory
4.	Circuit diagram with description	Compulsory
5.	Programming flowchart and its programme/coding	Optional
6.	PCB layout	Optional
7.	Implementation, Testing and Results	Compulsory
8.	Conclusion	Compulsory
9.	Future scope of work/ Extension of project idea	Optional
10.	Bibliography/ References	Compulsory
11.	Annexure-I (Datasheets of used components)	Compulsory

Note: Suggested guideline for formatting the project report.

1. 1 All pages should have page numbers at the center bottom of the page.
2. All text should be in Arial/Times New Roman fonts.
   2.1 Main Title size should be 16
   2.2 Subtitle size should be 14
   2.3 General Text size should be 12

9. SUGGESTED SPECIFICATION TABLE WITH WEEKS.

Phase No.	Phase Title	Working Weeks
I	Literature Survey, Project Identification	2
II	Design	6
III	Implementation	4
IV	Testing and Installation	1
V	Report writing and Presentation	1
Total		14

10. SOFTWARE/LEARNING WEBSITES

- http://www.electronicshub.org/electronics-projects-ideas/
- http://seminarprojects.com/Thread-ece-projects-topics-list-for-final-year-new-ideas
- http://indianengineer.wordpress.com
- http://www.slideshare.net/zettanetworks/final-year-engineering-project
- http://www.elprocus.com/final-year-engineering-projects-for-electronics-and-instrumentation-students/
- http://electronicsforu.com/newelectronics/default.asp
- http://www.majesticproject.com/
- http://anedotech.com
- http://www.apexengineeringproject.com
- http://1000projects.org
- http://www.ingenstech.com/projects-lists-2013-14/PLC%20SCADA%20Projects%20-%20INPLC.pdf

11. Assessment criteria for Effective Evaluation of the project

Evaluation of project should be made as per following guidelines

- 100 Marks are for Progressive Assessment to be evaluated by Institute concern Faculty / Guide for the Part-I only based on following criteria.

Sr. No.	Performance Criteria	Max.** Marks	Rating Scale				
			Excellent	Very Good	Good	Fair	Poor
1.	Selection of project assignment	10%	10	8	6	4	2
2.	Planning and execution of considerations	10%	10	8	6	4	2
3.	Quality of performance	20%	20	16	12	8	4
4.	Providing solution of the Problems or production of final product	20%	20	16	12	8	4
5.	Sense of responsibility	10%	10	8	6	4	2
6.	Self-expression/ communication skills	5%	5	4	3	2	1
7.	Interpersonal skills/human relations	5%	5	4	3	2	1
8.	Report writing skills	10%	10	8	6	4	2
9	Viva-voce	10%	10	8	6	4	2
Total marks		**100**	**100**	**80**	**60**	**40**	**20**

12. PO-COMPETENCY-CO MAPPING:

Semester VI	Major Project-I (Course Code:4361704)						
	POs						
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
Competency	The course should be facilitated and implemented, with the aim to develop Communicate and lead effectively as well as able to work independently but also collaboratively in multi disciplinary teams by acquiring soft skills and hard skills.						
Course Outcomes **CO1)**Apply in totality the knowledge and	3	3	3	3	2	1	3

skills gained through the course work in the solution of particular problem or by undertaking a project.							
CO2) Develop understanding of subject based knowledge given in the classroom in the context of its application at work places.	3	3	3	3	2	1	3
CO3) Learn and adopt first-hand experience and confidence amongst the students to enable them to use and apply polytechnic/institute based knowledge and skills to solve practical problems related to the world of work.	3	3	3	3	2	2	3
CO4) Develop abilities like interpersonal skills, communication skills, positive attitudes and values etc.	2	2	1	1	3	2	3
CO5) Attain skill for writing technical report and prepare poster/ppt for presentation.	2	1	1	1	2	3	3

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

13. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Member – Board of Studies (GTU), Electrical and Allied branches

Prof. Suresh Z. Shyara, IC Engineering, AVPTI, Rajkot

Prof. Mahesh J. Vadhavaniya, IC Engineering, Government Polytechnic, Palanpur

GTU Resource Persons

Prof. Shailaja N. Shah, IC Engineering, Government Polytechnic, Gandhinagar.

Prof. Devarsh J. Modi, IC Engineering, Government Polytechnic, Palanpur.