Practical Plan

Course Code: ECL 402

Subject Name: Controls and Instrumentation Laboratory

Teacher in charge : Narayanan Kallingal

Academic year and term : January – May 2023

Laboratory Objectives:

1. To determine performance of control systems
2. To determine stability of control systems
3. To understand the applications of instrumentation systems

Course Outcomes:
Upon completion of this course students will be able to:

Upon completion of this course students will be able to:
ECL 402.1. **S**imulate performance of control Systems
ECL 402.2. Analyze the stability of control systems
ECL 402.3. Develop the applications of instrumentation systems

Relationship of course outcomes with program outcomes: Indicate 1 (low importance), 2 (Moderate Importance) or 3 (High Importance) in respective mapping cell.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
ECL 402.1	-	-	-	-	3	-	-	-	-	-	-	-	-	-
ECL 402.2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
ECL 402.3	-	-	3	-	-	-	-	-	-	-	-	-	-	-
Course Average	-	3	3	0	3	0	0	0	0	0	0	0	0	0

Justification of PO to CO mapping

ECL 402.1	**PO5**	**S**imulate performance of control Systems using suitable software tools
ECL 402.2	**PO2**	Analyze the stability of control systems
ECL 402.3	**PO3**	Develop the applications of instrumentation systems

CO Assessment Tools:

Course Outcome		***Assessment Method***		
		Direct Method (80 %)		***Indirect Method (20%)***
	Lab	Oral	Semester End Examination	Course exit survey
ECL 402.1	30 %	30%	40%	100%
ECL 402.2	30 %	30%	40%	100%
ECL 402.3	30 %	30%	40%	100%

Rubrics for each assessment tool:

Assessment tool:	**Rubrics**		
Lab	Timeline (2)	Performance, Skill (4)	Understanding (4)

Practical Plan
SE ECS Semester IV

CLASS		SE ECS Semester IV	
Academic Term		Jan – May, 2023	(2022 – 23)
Subject		**Controls and Instrumentation Laboratory**	
Term Work		25 Marks	
Oral/Practical		25 Marks	
	Day	Batch	Time
Time Table	Tuesday	C	11.15 to 1.15
	Wednesday	B	11.15 to 1.15
	Thursday	A	9.00 to 11.00
	Friday	D	11.15 to 1.15

Experiments

Sr.No.	Title	Module
1	DC position control	1.1. Servomechanism
2	LVDT	4.2. Displacement Transducers
3	Temperature Measurements – Thermo couple	4.3. Temperature Transducers
4	Strain Gauge	4.2. Pressure Transducers
5	Transient Response Analysis	2.1. Time Response Analysis
6	Time Domain Specifications	2.1. Time Response Analysis
7	Type of Control Systems	2.1. Time Response Analysis
8	Root Locus	2.3. Stability Analysis
9	Bode Plots	3.2. Stability Analysis
10	PID Controller	5. Suggested experiment

Newly Added Experiments

1	LVDT	4.2. Displacement Transducers
2	Strain Gauge	4.2. Pressure Transducers

Practical Plan			
Experiment No. 1 DC position control			
Batch	*Dates*		
	Planned	*Actual*	
C	*24 – 01 – 2023*		
B	*25 – 01 – 2023*		
A	*02 – 02 – 2023*		
D	*27 – 01 – 2023*		
Experiment No. 2 LVDT			
C	*31 – 01 – 2023*		
B	*01 – 02 – 2023*		
A	*02 – 02 – 2023*		
D	*03 – 02 – 2023*		
Experiment No. 3 Temperature Measurements – Thermo couple			
C	*07 – 02 – 2023*		
B	*08 – 02 – 2023*		
A	*09 – 02 – 2023*		
D	*10 – 02 – 2023*		
Experiment No. 4 Strain Gauge			
C	*14 – 02 – 2023*		
B	*15 – 02 – 2023*		
A	*16 – 02 – 2023*		
D	*17 – 02 – 2023*		
Experiment No. 5 Transient Response Analysis			
C	*21 – 02 – 2023*		
B	*22 – 02 – 2023*		
A	*23 – 02 – 2023*		
D	*24 – 02 – 2023*		
Experiment No. 6 Time Domain Specifications			
C	*14 – 03 – 2023*		
B	*08 – 03 – 2023*		
A	*09 – 03 – 2023*		

D	*10 – 03 – 2023*		
Experiment No. 7 Type of Control Systems			
C	*21 – 03 – 2023*		
B	*15 – 03 – 2023*		
A	*16 – 03 – 2023*		
D	*17 – 03 – 2023*		
Experiment No. 8 Root Locus			
C	*28 – 03 – 2023*		
B	*29 – 03 – 2023*		
A	*23 – 03 – 2023*		
D	*24 – 03 – 2023*		
Experiment No. 9 Bode Plots			
C	*11 – 04 – 2023*		
B	*05 – 04 – 2023*		
A	*06 – 04 – 2023*		
D	*31 – 03 – 2023*		
Experiment No. 10 PID Controller			
C	*11 – 04 – 2023*		
B	*12 – 04 – 2023*		
A	*13 – 04 – 2023*		
D	*31 – 03 – 2023*		

Term Work :-

At least 10 experiments covering entire syllabus of Controls and Instrumentation (ECC 403) should be set to have well predefined inference and conclusion. The experiments should be student centric and attempt should be made to make experiments more meaningful, interesting. Additionally, an industrial visit to any relevant industry is compulsory. Experiments must be graded from time to time. The grades should be converted into marks as per the Credit and Grading System manual and should be added and averaged. The grading and term work assessment should be done based on this scheme. The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work. Practical and Oral exam will be based on the entire syllabus. The Term work assessment can be carried out based on the different tools and the rubrics decided by the concerned faculty members and need to be conveyed to the students well in advanced.

Submitted By	**Approved By**
Prof. Narayanan Kallingal	i) Dr. D V Bhoir Sign:
Sign:	ii) Prof. Shilpa Patil Sign:
Date of Submission:	**Date of Approval:**
Remarks by PAC (if any)	