Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: Industrial Electronics and DAS Lab		Course Code: 15MC44P
Mode (L:T:P) : 0:2:4	Credits:3	Core/ Elective: Core
Type of Course: Tutorials and Practical's		Total Contact Hours: 78
CIE- 25 Marks		SEE- 50 Marks

Pre-requisites: knowledge of Basic Electrical and Electronics and Semiconductor devices,

Course Objectives: Understand the working and characteristics of power semiconductor devices and circuits, development of motor control circuit, controlling the speed of motors, working of DAS card

Course Outcomes: At the end of the semester, students should be able to

1. Test the SCR,TRIAC,DIAC and UJT
2. Test the power semiconductor circuits like rectifier, cyclo converter, chopper ,inverter
3. Test the motor driver circuit, speed control of motors and develop motor control circuit
4. Use the Lab-View software for Measurement of V-I-R.

Course Outcome		Cognitive Level	Linked with PO	Teaching Hours
CO1	Test the SCR,TRIAC,DIAC and UJT	*A*	1,2,3	18
CO2	Test the power semiconductor circuits like rectifier, cycloconverter, chopper, inverter	*A*	1,2,3	18
CO3	Test the motor driver circuit, speed control of motors and develop motor control circuit	*A*	1,2,3	21
CO4	Use the Lab-View software for Measurement of V-I-R	*A*	1,2,3,4	21
		Total sessions		**78**

Legend: R; Remember, U: Understand A: Application

Mapping of Course Outcomes with Program Outcomes

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Industrial Electronics and DAS Lab	**3**	**3**	**3**	**2**	-	-	-	-	-	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Contents

Unit-I

1. To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: SCR
2. To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: Triac
3. To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: Diac
4. To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: UJT
5. To Construct and Test: UJT Relaxation Oscillator
6. To Construct and Test SCR triggered by UJT Relaxation Oscillator, Half and Full Wave.
7. To Construct and Test Phase Control of SCR by using R method.
8. To Costruct and Test Phase Control of SCR by using RC method
9. To Construct and Test Speed Control Circuit of DC Motor.
10. Develop the control circuit and load circuit for motor starter using only ON/OFF switch using two wire method.
11. Develop using three wire method START/STOP circuit with multiple START/STOP push buttons.
12. Develop the control circuit and load circuit for motor to rotate both in clockwise and anticlockwise direction.

Unit-II

Note: Perform the following experiments by using NI Lab View software and interfacing card.

1. Measurement of Voltage.
2. Measurement of Current.
3. Measurement of Resistance.
4. Measurement of Power.
5. Measurement of Temperature.
6. Measurement of Pressure.

Contents linked with CO and PO

Sl No	Contents	CO	PO
1	Construct half wave rectifier. Calculate ripple factor with and without pi filter. Study the wave forms on CRO To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: SCR	1	1,2,3
2	To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: Triac	1	1,2,3
3	To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: Diac	1	1,2,3
4	To plot V-I characteristics and test whether the device is GOOD or DEFECTIVE: UJT	1	1,2,3
5	To Construct and Test: UJT Relaxation Oscillator	2	1,2,3
6	To Construct and Test SCR triggered by UJT Relaxation Oscillator, Half and Full Wave	2	1,2,3
7	To Construct and Test Phase Control of SCR by using R method.	2	1,2,3
8	To Construct and Test Phase Control of SCR by using RC method	2	1,2,3
9	To Construct and Test Speed Control Circuit of DC Motor	3	1,2,3
10	Develop the control circuit and load circuit for motor starter using only ON/OFF switch using two wire method.	3	1,2,3
11	Develop using three wire method START/STOP circuit with multiple START/STOP push buttons.	3	1,2,3
12	Develop the control circuit and load circuit for motor to rotate both in clockwise and anticlockwise direction.	3	1,2,3
13	Measurement of Voltage using DAS card using NI Lab View software	4	1,2,3,4
14	Measurement of Current using DAS card using NI Lab View software	4	1,2,3,4
15	Measurement of Resistance. using DAS card using NI Lab View software	4	1,2,3,4
16	Measurement of Power. using DAS card using NI Lab View software.	4	1,2,3,4
17	Measurement of Temperature using DAS card using NI Lab View software	4	1,2,3,4
18	Measurement of Pressure using DAS card using NI Lab View software	4	1,2,3,4

Student Activity

Activity No.	Description of the Student Activity
1	Visit a nearby MSME/ workshop and prepare a hand written report on wiring diagrams or servicing techniques of motors, control drives, relay or Maintenance of Machine tools or Different motors, drives, control panels etc

Note:

1. Group of max four students should do any one of the above activity or any other similar activity related to the course COs and get it approved from concerned Teacher and HOD.
2. No group should have activity repeated or similar
3. Teacher should ensure activities by group must cover all COs
4. Teacher should asses every student by using suitable **Rubrics** approved by HOD

Rubrics

Dimension	Exemplary	Accomplished	Developing	Beginning	Roll No. of the Student				
	5/4	3	2	1	1	2	3	4	5
Organization	Information presented in logical, interesting sequence	Information in logical sequence	Difficult to follow presentation--student jumps around	Cannot understand presentation--no sequence of information	Ex: 2				
Subject Knowledge	Demonstrates full knowledge by answering all class questions with explanations and elaborations	At ease with expected answers to questions but does not elaborate	Uncomfortable with information and is able to answer only rudimentary questions	Does not have a grasp of the information. Cannot answer questions about subject	3				
Graphics	Explain and reinforce screen text and presentation	Relate to text and presentation	Occasionally uses graphics that rarely support text and presentation	Uses superfluous graphics or no graphics	4				
Oral Presentation	Maintains eye contact and pronounces all terms precisely. All audience members can hear	Maintains eye contact most of the time and pronounces most words correctly. Most audience members can hear presentation	Occasionally uses eye contact, mostly reading presentation, and incorrectly pronounces terms. Audience members have difficulty hearing	Reads with no eye contact and incorrectly pronounces terms. Speaks too quietly	5				
Total Score=(2+3+4+5)=14/4=3.5=4									

Course Assessment Pattern

Particulars			Max Marks	Evidence	Course outcomes
Direct Assessment	**CIE**	Two tests (Average of Two tests)	10	Blue books	1,2,3 &4
		Practical record	10	Practical record	1,2,3 &4
		Student Activity	05	Student Activity Sheets	1,2,3 &4
	SEE	End of the course	50	Answer scripts at BTE	1,2,3 &4
Indirect Assessment	**Student Feedback on course**	Middle of the course		Feedback forms	1 &2
		End of the course		Feedback forms	3 &4

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Scheme of valuation for SEE

Sl. No.	Performance	Max Marks
1	a)Writing a circuit diagram, graph, wave forms from unit-I b) construction, conduction &Results	10+15
2	a) Writing a circuit diagram, graph, wave forms from unit-II b) Results	10+05
3	Viva Voce	10
	TOTAL	**50**