NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF Instrumentation and Control Engineering

COURSE PLAN – PART I			
Name of the programme and specialization	B. Tech. Instrumentation and Control Engineering		
Course Title	SENSORS AND TRANSDUCERS LABORATORY		
Course Code	ICLR12	No. of Credits	2
Course Code of Pre-requisite subject(s)	-NA-		
Session	January 2019	Section (if, applicable)	B
Name of Faculty	Dr. P. A. Karthick K. Lakshmi	Department	ICE
Official Email	pakarthick@nitt.edu lakshmik@nitt.edu	Telephone No.	--
Name of Course Coordinator(s) (if, applicable)	Dr. P. A. Karthick K. Lakshmi		
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	☒ Core course	☐ Elective course	

Syllabus (approved in BoS)

1. Characteristics of (Resistive and Thermo emf) temperature sensor
2. Characteristics of Piezoelectric measurement system
3. Measurement of displacement using LVDT
4. Characteristics of Hall effect sensor
5. Measurement of strain using strain gauges
6. Measurement of torque using Strain gauges
7. Measurement using proximity sensors
8. Characteristics of capacitive measurement systems
9. Loading effects of Potentiometer
10. Design of Opto-coupler using photoelectric transducers
11. Characteristics of Micro pressure and Micro accelerometer sensing device
12. Study of speed measuring devices and Gyroscope

COURSE OBJECTIVES

1. To familiarize the students to the basic principles of various transducers.
2. To impart knowledge in static and dynamic characteristics of sensors.
3. To impart knowledge in the design of signal conditioning circuits for transducers.

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO)
1. The students will be able to analyze the static characteristics of different measurement systems	1, 3, 12
2. The students will be able to design signal conditioning circuits for transducers.	1, 2, 3
3. The students will be able to formulate the design specification of transducer for a given application.	1, 3, 6, 12

COURSE PLAN – PART II

COURSE OVERVIEW

- Sensors and transducers are widely used in industry and scientific research.
- This course is based on laboratory experiments in order to enhance their understanding level of various devices.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
		CYCLE- I	
1	1	Instruction and introduction of lab experiments	Chalk and Talk
2	2	Characteristics of thermocouple	Experiment
3	3	Characteristics of RTD	Experiment
4	4	Characteristics of thermistor	Experiment
5	5	Measurement of strain using strain gauge in full and half bridge configuration	Experiment
6	6	Characteristics and displacement measurement using LVDT	Experiment
7	7	Effect of modifying and interfering inputs to a strain gauge	Experiment
		CYCLE- II	
8	8	Measurement of displacement using capacitive and inductive sensor	Experiment
9	9	Loading effects of potentiometer	Experiment
10	10	Characteristics of pressure sensing device	Experiment
11	11	Characteristics of Hall effect sensor	Experiment
12	12	Characteristics of optocoupler using photoelectric transducer	Experiment
13	13	Study of speed measuring device	Experiment
14	14	Compensation lab	Experiment

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week	Duration	% Weightage
1	Internal Assessment (Experimentation and observation & record maintenance)	During every class	3 hours	60
2	External Assessment	15th week	2 hours	40

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

Reference Books:

1. John P. Bentley, Principles of Measurement Systems, Pearson Education, 4th Edition, 2005.
2. Ernest. O. Doebelin and Dhanesh. N. Manik, Doebelin's, Measurement Systems, McGraw Hill Education, 6th Edition, 2011.

COURSE EXIT SURVEY

Direct feedback from the student and also feedback of the students from the class committee meeting will be used to access the course.

COURSE POLICY

- Each student has to maintain individual observation and record.
- Relative grading will be used to award the marks.
- The passing minimum for this course is 35% or (Class average/2) whichever is greater.
- Student who fail in the course and those who absent for the final assessment has to write reassessment provided if they have satisfied the essential requirements. And only one reassessment will be conducted for this course.
- Student fail in reassessment has to do formative assessment only.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HOD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

ADDITIONAL INFORMATION

The students are advised to complete their experiments during the laboratory hour itself.

FOR APPROVAL

Course Faculty P. A. Vanitha / (K. LAKSHMI) CC- Chairperson 28/1/19 HOD 28/1/19