NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN			
Name of the Programme and Specialization	B.Tech- Instrumentation and Control Engineering		
Course Title	Sensors and Transducers Laboratory		
Course Code	ICLR12	Course credits	2
Pre-requisites Course Code	NIL		
Session	Jan 2020	Section	A
Name of Faculty	Dr. R. Periyasamy	Department	ICE
E-mail	periyasamyr@nitt.edu	Mobile No.	09179826937
Course Coordinator(s) (if, applicable)	NA	Telephone No.	NA
Other Course Teacher(s)/Tutor(s) E-mail	NA	Mobile No.	NA
Course Type	■ Core laboratory course	☐	Program Elective course

Syllabus (approved in BoS)

List of Experiments

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.

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COURSE OUTCOME (CO)

On completion of this lab course , the students will be able to,

1. Analyze the static characteristics of different measurement systems.
2. Design signal conditioning circuits for transducers.
3. Formulate the design specification of transducer for a given application.

Course Outcome (CO)	Aligned Program Outcomes(PO)
On completion of this lab course the students will,	
1. Analyze the static characteristics of different measurement systems	1
2. Design signal conditioning circuits for transducers	1
3. Formulate the design specification of transducer for a given application	1,2

COURSE OVERVIEW

The aim of this lab is to expose the students with adequate hands on experience in the measurement of different physical quantities and develop their expertise in handling the sensors and transducers involved in the system.

COURSE TEACHING AND LEARNING ACTIVITIES

Lecture no.	Periods/ weeks	Topic	Delivery mode
1	1 to 6 weeks	Characteristics of temperature sensor (RTD)	Practical Experimentation
2		Characteristics of temperature sensor (Thermistor)	Practical Experimentation
3		Characteristics of temperature sensor (Thermocouple)	Practical Experimentation
4		Measurement of strain using strain gauge in half bridge configuration	Practical Experimentation
5	7th week	**Assessment-1**	
6	8 to 10 weeks	Measurement of strain using strain gauge in full bridge configuration	Practical Experimentation
7		Characteristics of LVDT	Practical Experimentation
8		Effect of modifying and interfering inputs to system	Practical Experimentation
9	11th week	**Assessment-2**	
10		Loading effects of Potentiometer	Practical Experimentation

11	12 to 14 weeks	Characteristics of Opto –coupler using photoelectric transducer	Practical Experimentation
12		Study of speed measuring devices	Practical Experimentation
13	15th week	**Assessment-3**	

LAB COURSE ASSESSMENT METHODS

Sl.No.	Mode of Assessment	Week/Date	Duration	Percentage
1	Assessment 1	6th Week –Observation and Lab report evaluation (1 to 4 experiments),viva voce		25 %
2	Assessment 2	12th Week- Observation and Lab report evaluation (5 to 7 experiments), viva voce		20 %
3	Assessment 3	15th Week - Observation and Lab report evaluation (8 to 10 experiments),viva voce		15%
4	Final Practical Examination*	End of the semester	3 hours	40%

***mandatory; refer to guidelines on page 3 and page 4**

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 (mention the ways in which the feedback about the course is assessed)

1. Direct feedback from the students by having face-to-face meeting individually / as the class as a whole.
2. Feedback from the students during the class committee meetings
3. Students' performance during Lab practical hour.

COURSE POLICY (preferred mode of correspondence with students, re-assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc) : Email and Phone

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.
  - Undergoing internship in foreign countries with prior permission
  - Participating in the Institute approved extracurricular activities such as Sports,

Cultural meets, Seminar, Workshop, Conference with prior permission

- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

Grading:

1. The passing minimum should be 35% or (Class average/2) whichever is greater.

Re-Assessment Exam

- Student who absent in any of the lab (due to OD and other valid/genuine reason) will be given Compensation Lab or Repeat Lab.
- Students who failed in the subject during the End Sem practical exam will have to register and write the re-assessment examination (Absolute grading where passing minimum is 35).
- Re-assessment exam will be conducted in the first week of the next semester or earlier during the vacation.

Formative Assessment (FA):

1. Students who have failed after Re-Assessment Exam of the course will have to register and pass the course by Formative Assessment (FA) only.

Academic honesty & plagiarism :

1. Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
2. Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
3. 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.
4. The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

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

FOR APPROVAL

Course Faculty: 24/1/2020 CC-Chairperson: 24/1/2020 HOD: 24/1/2020

(Dr.R.Periyasamy) (Dr. B.Vasuki) (Dr.G Uma)