DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGG.

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	**B.Tech in Instrumentation and Control Engineering**		
Course Title	**Sensors and Transducers Laboratory - (IV Semester)**		
Course Code	**ICLR12 - (IV semester)**	**No. of Credits**	**02**
Course Code of Pre-requisite subject(s)			
Session	**January 2020**	**Section (if, applicable)**	**B**
Name of Faculty	Dr. Karthick P.A	**Department**	**ICE**
Email	pakarthick@nitt.edu	**Telephone No.**	
Name of Course Coordinator(s) (if, applicable)			
E-mail		**Telephone No.**	
Course Type	☑ **Core course**	☐ **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

The objectives of this course is:

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.

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

COURSE PLAN – PART II

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

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1.	1st to 5th week	Characteristics of temperature sensor (RTD and Thermistor)	Practical Experimentation
2		Characteristics of temperature sensor (Thermocouple)	Practical Experimentation
3		Measurement of strain using strain gauge in full and half bridge configuration	Practical Experimentation
4		Characteristics of LVDT	Practical Experimentation
5	6th week	Assessment-1	
6	7th to 10th week	Effect of modifying and interfering inputs to system	Practical Experimentation
7		Loading effects of Potentiometer	Practical Experimentation
8		Characteristics of Opto –coupler using photoelectric transducer	Practical Experimentation
9		Characteristics of pressure sensing device	Practical Experimentation
10	11th week	Assessment –2 & Assessment-3	
11	12th to 14th week	Characteristics of Hall effect sensor	Practical Experimentation

12		Determination of damping ratio of a second order system	Practical Experimentation
13		Study of speed measuring devices	Practical Experimentation

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	First assessment (Internal Laboratory Exam)	6th week	One hour	20%
2.	Second assessment (Comprehensive Exam)	11thweek	One hour	30%
3.	Third assessment (Internal Laboratory Exam)	14thweek	One hour	20%
3.	Final assessment (Practical Exam)	15thweek	Three hours	30%

COURSE EXIT SURVEY

1. Indirect feedback through questionnaire.
2. Direct feedback from the students.
3. Feedback from the students during the class committee meetings.

COURSE POLICY

MODE OF CORRESPONDENCE (email/ phone etc.)

Any suggestions, Queries and feedback can be emailed to the Course Coordinator directly at pakarthick@nitt.edu

COMPENSATION ASSESSMENT

Only one compensation assessment (20% weightage) will be conducted for the students who absent for any of the assessment other than final assessment due to medical, on-duty and other genuine reasons. The decision of the faculty will be the final to decide about retest. The duration of the exam is 1 hour and it will be conducted based on the experiments done on the laboratory.

Retest/Reexamination

If student got less than 35% marks with satisfactory attendance requirement (Refer attendance Policy), He / She has to undergo retest/supplementary examination.

Retest/supplementary examination will be conducted at the end of 14th week for 1-hour duration.

Passing Criteria /Awarding Grade

The minimum passing criteria is 35%. If the student fails in scoring the minimum criteria after retest / reexamination or absent for retest / reexamination, they should undergo formative assessment (FA).

ATTENDANCE POLICY

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

ACADEMIC DISHONESTY & 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 will 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.

The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

Students can meet the faculty any time depends on their mutual availability. The course faculty will be available in Lyceum Block (Room No: 316, Second floor, ICE Department wing). Minor doubts will be clarified during the class hours itself.

FOR APPROVAL

Course Faculty _____ **CC-Chairperson** _____ **HOD** _____

Guidelines:

a) **The number of assessments for a course shall range from 4 to 6.**

b) **Every course shall have a final assessment on the entire syllabus with at least 30% weightage.**

c) **One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered. Details of compensation assessment to be specified by faculty.**

d) **The passing minimum shall be as per the regulations.**

e) **Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.**

f) **Absolute grading policy shall be incorporated if the number of students per course is less than 10.**

g) **Necessary care shall be taken to ensure that the course plan is reasonable and is objective.**