

Department of Instrumentation and Control Engineering
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE			
Course Title	Sensors and Transducers		
Course Code	IC PC11	No. of Credits	3
Department	ICE	Faculty	Section A: Dr. M. Umapathy Section B: Dr. G. Uma
Pre-requisites Course Code	NIL		
Course Coordinator(s) (if, applicable)	Not Applicable		
Other Course Teacher(s)/Tutor(s) E-mail	umapathy@nitt.edu guma@nitt.edu	Telephone No.	0431-2503353 04312503359
Course Type	Core course		
COURSE OVERVIEW			
<p>The course consist of basic concepts of Measurement system, its characteristics and its design, with emphasis on different types transducers and its conditioning circuits. Basic introduction to Microsensors and its fabrication is also covered.</p>			
COURSE OBJECTIVES			
<ol style="list-style-type: none"> 1. To expose the students to various sensors and transducers for measuring mechanical quantities. 2. To understand the specifications of sensors and transducers. 3. To learn the basic conditioning circuits for various sensors and transducers. 4. To introduce advances in sensor technology 			
COURSE OUTCOMES (CO)			
Course Outcomes	Aligned Programme Outcomes(PO)		
1. Familiar with the basics of measurement system and its input, output configuration of measurement system.	1		
2. Familiar with both static and dynamic characteristics of measurement system.	1,6		
3. Familiar with the principle and working of various sensors and transducers.	1,3		
4. Able to design signal conditioning circuit for various transducers. (i) Able to identify or choose a transducer for a specific measurement application.	1,6		

COURSE TEACHING AND LEARNING ACTIVITIES

S. No	Week	Topic	Mode of Delivery
1	11.7.16 to 5.8.16	General concepts of design of measurement system and its characteristics	Lecture and power point presentation. Discussion and presentation by students.
2.	8.7.16 to 24.8.16	Resistive transducers introduction, design of signal conditioning circuit and its application.	Lecture and power point presentation. Invited talk by Industrial experts. Discussion and presentation by students.
3	26.8.16 to 14.9.16	Inductance and capacitive Transducers introduction, it's conditioning circuits and application. Speed measuring transducers	Lecture and power point presentation. Invited talk by Industrial experts
4	16.9.16 to 5.10.16	Piezo electric transducers its signal conditioning circuits, seismic transducer model and its discussion, and photoelectric and Hall effect transducer	Lecture and power point presentation. Discussion and presentation by students.
5	10.10.16 to 21.10.16	Introduction to Semiconductor sensors, materials, scaling issues and its fabrication and design tools. Brief discussion on Digital Displacement sensors and smart sensors	Lecture and power point presentation.

COURSE ASSESSMENT METHODS

S. No	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Unit Test I	9.8.16	1 hour	15%
2.	Unit Test II	25.8.16	1 hour	15%
3.	Unit Test III	15.9.16	1 hour	15%
4.	Unit Test IV	7.10.16	1 hour	15%
5.	Unit Test V	25.10.16	1 hour	15%
6.	Participation in class discussion and project on measurement system design (new and innovative idea)			25%

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

1. John P. Bentley, Principles of Measurement Systems, Pearson Education, 4th Edition, 2005.
2. Doebelin E.O, Measurement Systems - Application and Design, McGraw-Hill, 4th Edition, 2004.
3. S.M. Sze, Semiconductor sensors, John Wiley & Sons Inc., 1994.
4. B.C.Nagra And K.K Chaudry, Instrumentation Measurement and Analysis.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

Feedback from students will be obtained during the course
Students' performance in test and their presentation during discussion will be used to assess the understanding level.

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

1. 80% of attendance is must inclusive of on duty on any grounds. 5% of relaxation can be considered on medical grounds.
2. Relative grading with passing minimum of 40 % or clustering will be followed, on seeing the overall performance of the students at the end of the semester.

ADDITIONAL COURSE INFORMATION

NIL

FOR SENATE'S CONSIDERATION

Course Faculty

1. [Signature]
2. [Signature]

CC-Chairperson

[Signature]

HOD

[Signature] 8/8/16