

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. G. Uma
Pre-requisites Course Code	NIL		
Course Coordinator(s) (if, applicable)	Not Applicable		
Other Course Teacher(s)/Tutor(s) E-mail	guma@nitt.edu	Telephone No.	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.	1,6		
5. 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	10.7.17 to 3.8.17	General concepts of design of measurement system and its characteristics	Lecture and power point presentation. Discussion and presentation by students.
2.	7.8.17 to 24.8.17	Resistive transducers introduction, design of signal conditioning circuit and its application.	Lecture and power point presentation. Discussion and presentation by students.
3	28.8.17 to 14.9.17	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	18.9.17 to 5.10.17	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	9.10.17 to 20.10.17	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. Invited talk by Industrial experts

COURSE ASSESSMENT METHODS

S. No	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Unit Test I	4 th week of Aug-2017	1 hour 30min	20%
2.	Unit Test II	3 rd week of Oct-2017	1 hour 30 min	20%
3.	Final Assesment	3 rd week of Nov-2017	3 hours	40%
4	Open book test, Assignment and Participation in class discussuion			20%

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, Instrumentationa 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. 75% of attendance is must inclusive of On duty on any grounds. 5% of relaxation can be considered on medical grounds. Students not acquiring the required attendance will be assigned V grade.
2. Relative grading with passing minimum of 35 % or clustering will be followed, on seeing the overall performance of the students at the end of the semester.
3. For the students missing the unit tests for medical reasons, one compensation assessment will be conducted one week before the final assessment for a weightage, equal to that of the missed assessments. But students are advised not to miss the assessments.
4. Students securing less than 35% of marks will be given a reassessment after two weeks of the final assessment for a weightage of 40% and marks secured will be added to the continuous assessment marks and appropriate grades will be awarded.
5. For the students not passing the course even after the reassessment for final assessment, one final reassessment will be given during the first week of next semester for a weightage of 100% and the grades will be given on absolute grading policy. Students failing in the same have to take up Redo or Formative Assessment.

ADDITIONAL COURSE INFORMATION

NIL

FOR SENATE'S CONSIDERATION

Course Faculty *[Signature]* CC-Chairperson *Goldin R. Bennet* HOD *B. V. Ramani*
19-7-2017

