UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2019/2020
BACHELOR'S DEGREE (BSC)	MECHANICAL ENGINEERING
SUBJECT	MECHANIC AND THERMAL MEASUREMENTS
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50302-Ingegneria meccanica
CODE	05269
SCIENTIFIC SECTOR(S)	ING-IND/12
HEAD PROFESSOR(S)	D'ACQUISTO LEONARDO Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	144
COURSE ACTIVITY (Hrs)	81
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	3
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**D'ACQUISTO LEONARDO** Thursday 08:30 10:00 Edificio 8 - stanza docente

DOCENTE: Prof. LEONARDO D'ACQUISTO

PREREQUISITES	General concepts of mathematical analysis (calculus of derivatives and integrals), General concepts of phisycs (knowledge of main physical quantities, measurement units' systems) . Basic principles of electrotechnology (resistive, inductive and capacitive circuits).
LEARNING OUTCOMES	Knowledge and understanding The student, at the end of the course, will have knowledge about methodologies to apply and solve effectively the problems of measurement of mechanical and thermal quantities. Applying knowledge and understanding The student will have acquired knowledge, methodologies and the conceptual approach requested to analyze and solve problems related to the identification and selection of measurement techniques fit to the correct measurement of the quantity of interest. Making judgments At the end of the course the student will be able to integrate knowledge and handle complexity, as well as to make judgments based on limited information. Communication skills The student will be able to properly communicate with language skills, both to expert or common level people, its conclusions as well as the underlying knowledge and rationale about issues related to the approach to the definition and development of a measurement process. Learning skills The student will have developed those learning skills that let him to autonomously master issues such as the optimization of the resources used for the purpose of reducing uncertainty associated with the measurement result.
ASSESSMENT METHODS	Oral exam Evaluation criteria for the oral examination The oral test consists of an interview, in order to check that you have skills and knowledge disciplinary provided by the course; the evaluation is expressed in thirtieths. The questions, both open both semi-structured to test the results of learning provided for, will tend to occur: a) the knowledge captured; b) the processing capacity, c) have adequate display capacity on the course contents. The final evaluation will be formulated according the following graduation of knowledge of the student. Excellent 30-30 and praise, very good knowledge of the topics, excellent properties of language, good analytical ability, the student is able to apply knowledge to effectively solve measurements problems proposed 26-29 Very Good, Good command of the topics, full of language, the student is able to apply knowledge to solve measurements problems proposed 24-25 good, basic understanding of the main topics, discrete properties of language, with limited ability to independently apply the knowledge to the solution of the proposed problems Satisfactory 21-23, has not fully mastered the main teaching subjects but it has the knowledge, satisfactory property language, poor ability to independently apply the knowledge acquired Sufficient 18-20, Minimum basic understanding of the major teaching and technical language issues, very little or no ability to independently apply the knowledge acquired Insufficient, it does not have an acceptable knowledge of the contents of the topics covered in the teaching
EDUCATIONAL OBJECTIVES	OBJECTIVES OF CORSE The overall aim of the present course is to present the topics of measuring systems as an integrated and coherent subject. Actually, sensors and instruments are of immense importance in a wide variety of applications. The growth in the sophistication of instruments have been particularly significant, however little efforts are posed to the data validation, that is the full exploitation of inaccuracy associated to the collected data. Thus, questions still linger over how to objectively assess: the accuracy, response time, residual life, and other characteristics of employed instrumentation. The Course in Mechanical and Thermal Measurements is intended: to offer practical means to identify them; to assess their consequences; and to help resolve them. Therefore, the aim of the course is to provide a solid foundation for the design of effective measuring systems in Mechanical Engineering and for reaching valid experimental data.
TEACHING METHODS	Frontal lessons. Classroom exercises and laboratory experiences
SUGGESTED BIBLIOGRAPHY	- Vallascas R. : Fondamenti di misure meccaniche e termiche Grandezze statiche e sistemi. Editore: HOEPLI , 2008 - Doebelin, Ernest O. - "Strumenti e metodi di misura" " II edizione – McGraw-Hill, 2008 - Dispense a cura del docente in formato pdf

SYLLABUS

Hrs	Frontal teaching
25	Basics of measurements, instruments and measuring systems. Analytical models of instruments' dynamic response
5	Elements of statistics for measurement data analysis. Measurement uncertainty for industrial quality
30	Sensors and transducers for mechanical and thermal measurements

Hrs	Practice
6	Elements of statistics and uncertainty evaluation with applications to practical cases of uncertainty evaluation procedures

Hrs	Practice
12	Calibration procedures of measurement instrumentation for mechanical and thermal measurements
6	Use of optical and electrical techniques to the experimental characterization of surface strain on specimen and material's samples