

# ENGINEERING FOR SAFETY OF CRITICAL INDUSTRIAL AND CIVIL

(Lecce - Università degli Studi)

## Teaching MEASUREMENTS AND SENSORS FOR INFRASTRUCTURES

GenCod A007229

**Owner professor** Aime LAY EKUAKILLE

**Teaching in italian** MEASUREMENTS AND SENSORS FOR INFRASTRUCTURES

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**SSD code** ING-INF/07

**Reference course** ENGINEERING FOR SAFETY OF CRITICAL INDUSTRIAL AND

**Course type** Laurea Magistrale

**Credits** 6.0

**Teaching hours** Front activity hours: 54.0

**For enrolled in** 2024/2025

**Taught in** 2024/2025

**Course year** 1

**Language** ENGLISH

**Curriculum** CIVIL INFRASTRUCTURES

**Location** Lecce

**Semester** Second Semester

**Exam type** Oral

**Assessment** Final grade

**Course timetable**

<https://easyroom.unisalento.it/Orario>

BRIEF COURSE DESCRIPTION	<p>MEASUREMENTS AND SENSORS FOR INFRASTRUCTURES</p> <p>Part I</p> <p>Introduction</p> <p>Measurement concepts</p> <p>Uncertainty and its determination</p> <p>Metrological features</p> <p>Analog and digital measurement chains</p> <p>Electrical, magnetic, mechanical and thermal sensors</p> <p>Part II</p> <p>CBRN Sensors and sensing systems</p> <ol style="list-style-type: none"> <li>1) chemical devices</li> <li>2) biological devices</li> <li>3) Radiological devices</li> <li>4) Nuclear devices</li> </ol> <p>Filters and Instrumentation for measurement</p> <p>Part III</p> <p><u>Applications, exercises and laboratory for SCICI</u></p> <p>Construction of circuits for acquisitions from sensors</p> <p>Ground measurements and insulation</p> <p>Electrical quantities measurements</p> <p>Infrared measurements</p> <ol style="list-style-type: none"> <li>1) Monitoring fluid pipelines: waterworks, and oil and gas pipelines</li> <li>2) Civil facilities: bridges, and buildings</li> <li>3) Bunkers, shelters, and military facilities</li> <li>4) Nuclear depots</li> <li>5) Petrochemical facilities</li> <li>6) Power plants</li> <li>7) Monitoring disasters due to/within SCICI</li> </ol> <p>Simulations using Matlab, Labview, Solidworks, Comsol, and Proteus</p>
REQUIREMENTS	Basic knowledge of Electrical Engineering (Theory of Circuits), Physics, hopefully Electronics (Fundamentals) are necessary
COURSE AIMS	Making students aware of the use of monitoring systems for safety of critical industrial and civil infrastructures (SCICI) in the efforts to control them during and after a wrong operating mode. Giving them the capability of designing and characterizing monitoring systems.
TEACHING METHODOLOGY	Lessons, exercises, and laboratory activities
ASSESSMENT TYPE	Oral and/or written, after an assigned project assessment.
REFERENCE TEXT BOOKS	Materials from the Professor that will be available within the Team repository/platform