

Course Syllabus for  
*Smart and Sustainable Industry PhD Program*  
 (years 2024-25 / 2025-26)

<b>Course title</b>	<b>Time-series databases for sensor data analysis</b>
<b>Scientific Discipline Sector</b>	ING-INF/05
<b>Hours of instruction</b>	20 hours
<b>CFU</b>	2 CFU
<b>Semester</b>	First
<b>Goal</b>	<p>Despite significant advances in sensor data modeling, most of the space-time data models proposed in the past decade rely on time-stamping of collected data values, simply reusing solutions available in relational databases.</p> <p>The main purpose of the course is to introduce basic notions about modeling time-series information, highlighting the complexity of managing spatiotemporal data and state-of-the-art tools in this field.</p> <p>The course also provides theory, models and methods related to time series analysis detailing the main techniques used to extract value from raw data and to identify new useful information. Predictive analytics approaches, suitable for sensor data analysis, are described and applied to real-world case studies by means of hands-on practical exercises.</p>
<b>Syllabus</b>	<ul style="list-style-type: none"> <li>• Time-series database: features of time-series data - variability, seasonality, stationarity, autocorrelation; time-series modeling approach - structured data, data stream; basic geospatial data types; time-series DBMS</li> <li>• Processing time-series data: data visualization and monitoring solutions; predictive analytics for sensor data</li> <li>• Using a time-series database: collect data from sensors and systems; query time series data; visualize and manage time series data; processing, analyzing and acting on time series data in real time.</li> </ul>
<b>Bibliography</b>	A. Nielsen. Practical Time Series Analysis. O'Reilly Media, Inc. (2019) - ISBN: 9781492041658
<b>Examination method</b>	Online evaluation form composed of 15 multiple choice questions