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

Course title	**Microwave Photonics for Smart Systems**
Scientific Discipline Sector	ING-INF/01
Hours of instruction	20 hours
CFU	2 CFU
Semester	Second
Goal	Microwave photonics is an important interdisciplinary field that, among a host of other benefits, enables engineers to implement new functions in microwave systems. From an educational perspective, the fields of microwave engineering and photonics are often taught in separate courses. This course aims to provide both a theoretical and practical introduction to microwave photonics devices and applications. The first part is on microwave photonics principles and technologies, with a focus on applications and future developments. The second part is a laboratory and aims to prepare students for the final project. It will be shown how to design a simple component, following all the steps from the choice of technological platform to software simulations.
Syllabus	Opening with an overview to the subject, this course covers direct modulation, photonic oscillators for THz signal generation, and terahertz sources. It takes a unique application-focused approach and describes: • Advantages with respect to standard RF technologies; • Basic building blocks; • Design criteria; • Microwave photonic signal processing for Space applications; • Biomedical applications.
Bibliography	Slides provided during the lessons
Examination method	Final project