Courses freely chosen by the students
Integrated courses

Integrated course:
Smart monitoring of Civil infrastructures

Advanced monitoring for Civil Engineering applications, 6 CFU, Bologna
At the end of the module, the student will have knowledge of available methods and techniques for the design and management of monitoring systems for Civil Engineering applications. Topics covered in the course range from monitoring of infrastructures for structural identification and potential damage assessment, to monitoring and warning systems for landslide and flood risk mitigation.

Technologies for monitoring of infrastructures, 6 CFU, Cesena
At the end of this module, the student will have the ability to select the most appropriate sensors for a given infrastructural monitoring application, knowledge of the basic components and design criteria for data acquisition systems, knowledge of technologies and algorithms for sensor data processing and storage.

Integrated course:
Smart City Infrastructures

Intelligent Cyber-Physical Systems, 6 CFU, Cesena
At the end of the course, the student will have knowledge of available methods, tools and technologies for the design and management of intelligent cyber-physical systems and services, especially in applications of monitoring and control of civil critical infrastructures in smart cities. Topics covered in this course include: cloud/fog/edge/IoT architectures, adaptive and intelligent systems engineering, embedded and mobile computing.

Smart cities Civil infrastructures, 6 CFU, Bologna
At the end of this module, the student will have the methodological, theoretical and empirical skills for planning, design, simulation and performance evaluation of digitally-empowered civil networks infrastructures, with special emphasis on innovation in people mobility, goods transportation and hydraulic networks, in a context of smart and climate neutral cities.

Integrated course:
Smart Communication Infrastructures

5G intelligent networks and systems, 6 CFU, Cesena
At the end of the course, the student will have knowledge of available methods and technologies for the design and management of 5G and beyond intelligent networks and systems for ICT applications. Topics covered in the course include: 5G architecture, deep-learning for intelligent networks, wireless technologies, service coverage and planning, localization capability. Applications and case studies include the design of 5G intelligent networks for: Industrial IoT; disaster recovery; high data-rate traffic areas for crowded venues and cities; mission critical machine-to-machine applications; intelligent mobility monitoring and logistics; autonomous vehicles and drones.

Programmable networks, 6 CFU, Cesena
Students will acquire knowledge of network programmability and virtualization techniques, that are the novel design principles of the 5G and beyond core networks. They will learn the principles of Software Defined Networking and of Network Function Virtualization Management and Orchestration. Students will understand why these concepts are key to the network slicing principle, which is at the basis of an effective support of vertical applications. They will apply these concepts to use cases and projects referring to specific vertical applications such as, but not limited to, Industrial IoT and mission critical scenarios.