

**1° EDITION**  
**INTERNATIONAL MASTER IN INTEGRATED INTERSECTORAL  
AND MANAGERIAL PLANNING OF SMART CITIES**  
**January 2024 - June 2024**

**'BE SMART IN THE CITY'**  
**Programme**

**This program provides a comprehensive and in-depth view of Smart Cities, guiding the attendans through a series of well-structured modules to acquire the skills and knowledge needed to address the challenges and opportunities of smart cities.**

*Module I: Definition of the Smart City and Its Models*

Lesson: **Agrosi**

1. Definition of Smart City
2. The smart city analytical systems
3. The risk factors
4. Urbanism concept transferred into the smart city

Lesson: **Paragano**

1. The management of transformation projects
2. Project management for Smart Cities
3. How to transform a city with project management
4. Objectives, main advantages and disadvantages of a Smart City

*Module II: Smart City Development and Sustainability*

Lesson: **Marcatili, Giordano, Ricchio**

1. From Smart Cities to Senseable Cities
2. New Living Values
3. Tools for effective planning
4. Perspectives for systemic and transferable urban design
5. Sustainable development in Smart Cities

*Module III: Digital Solutions and Innovation Manager*

Lesson: **Zilli**

1. Innovation in Smart Cities: Key concepts and objectives of smart cities
2. Role of Innovation: Explanation of the crucial role of innovation in the context of Smart Cities
3. Innovation trends in smart cities: Exploring current and future innovation trends
4. Case study: analysis of successful cases that have embraced innovation to improve quality of life and efficiency
5. Social Innovation: Discussion on how innovation can positively influence the social aspect of Smart Cities
6. Risks and Challenges: innovation in smart cities

## 7. Case Study: Analysis of case studies of cities adopted sustainable technologies and strategies

### *Module IV: Building Information Modeling - BIM*

#### Lesson: **Zacchei**

1. Birth and Evolution of BIM
2. What is BIM: Building Information Modeling
3. The dimensions of BIM
4. Interoperability
5. BIM as an interoperable model extended to the life cycle
6. Impact of digitization on the construction supply chain
7. The reconfiguration of processes through the management of information models
8. The construction sector at a turning point: BIM as a virtual prototype
9. Virtual prototype
10. 'Building better before building
11. BIM: from virtual prototype to digital twin in a Smart City context
12. From the atom to bit: the digital twin
13. BIM and digital twin
14. Smart buildings and an urban digital twin

### *Module V: Microclimate, Environment and Climate change*

#### Lesson: **Georgiadis**

1. Urban Climatology;
2. Fundamentals of Urban Meteorology and Pollution: Urban meteorological processes.
3. The Planetary Boundary Layer. Impacts on: coastal settlements, valley settlements, and mountain settlements.
4. Atmospheric pollution: primary and secondary pollutants, formation and fate.
5. Processes of transport and deposition;
6. Impacts on Human Health: Equitability and sustainability of the urban environment. The fragile population.
7. Direct and indirect effects on health. The concept of exposure and risk.
8. The role of Climate Change. Quality of life – quality of cities nexus. Toward a human-centered approach;
9. The Surface Energy Balance: Partition of the solar energy at the surface. Analysis of the partition in natural and anthropized environments. Surface effects and magnitude of the partition;
10. Regenerative actions for the mitigation and adaptation;
11. The Surface Radiation Balance: General properties of Solar radiation and the interaction with the built environment. Properties of materials in the built environment.
12. Old and new materials: the role of local regulations. Adiabatic cooling of the city;
13. The Urban Hydrological Balance: The balance components. New settlements and history from a hydrological point of view and extreme weather events.
14. Adaptation and mitigation with old and new techniques: from Uchimizu to SUDS;

15. Applications to real urban Environments: Examples of real applications to urban environments and to policies.

16. The legislative frame for Europe and potential up-scaling. Conservazione dell'ambiente naturale nelle città Riduzione dell'inquinamento atmosferico e idrico;

Lesson: **Baldi**

1. Climate Change (Part I)

Lesson: **Sannino**

2. Climate Change (Part II)

### *Module VI: Water networks and digital world - Acquedotto Pugliese - AQP.*

Lesson: **Mottola**

1. Monitoring on hydraulic infrastructure behavior

Lesson: **Mazzolani**

2. Measurements and remote control of hydraulic works

Lesson: **Cagiano**

3. Smart metering.

Lesson: **Lanza**

4. SWM – Smart Water Management

### *Module VI: Agriculture 4.0 and Urban Gardens*

Lesson: **Rossi**

1. Climate- Smart Agriculture

Lesson: **Messori**

1. Community Gardens and working with local authorities, municipalities, and public sector
2. City farms, social farms, and e urban community gardens

Lesson: **Agrosi**

1. Rural Transformation

### *Module VII: Green Mobility - Hydrogen on the Road - Green Mobility Boats*

Lesson: **Miccolis**

1. Green, intelligent, and shared urban transport systems: the Miccolis experience

Lesson: **Vitali**

1. Energy efficiency and green mobility: FAAM experience

Lesson: **Calzolaio**

1. Models of slow, accessible, and sustainable mobility for inland and coastal waters: the Venice lagoon as a field of experimentation and application

### *Module VIII: Energy Transition*

Lesson: **Galletto**

1. Full beneficial electrification of an economy: The New York City and New York State Green Deals

2. Decarbonization in housing and climate justice
3. New climate-tech and energy solutions in urban areas

Lesson: **Trasi**

1. Energy project as urban design, designing the energy transition

*Module IX: Metaverse & Virtual Transformation and Augmented Reality*

Lesson: **Cappannari**

1. The Metaverse Experience: The hyped narrative of the Metaverse. Spatial Computing and the Fourth Computing Revolution. Enabling technologies: history
2. Virtual Worlds: Born from gaming, the importance of Engagement. From games to social networks. Digital ownership, blockchain & web3. Artificial and virtual beings
3. Extended Realities: AR/VR/MR, all blending into XR. The “media without media”, and direct emotions. Presence, Lifelike experiences, and the impact on our brains. The dematerialization of the world
4. Metaverse in Business: Virtual transformation of companies and business models. Impacts on: Sales & Marketing; Offices & HR; Operations
5. Virtual Transformation of the World: A new way to see and interact with the world. The dematerialization of everything. A technology convergence
6. Workshop

Lesson: **Borghi**

1. “Earth Observation Technologies for Smart City”

*Module X: Smart City and Cultural Heritage - Architecture in the New Digital Era*

Lesson: **Agrosi**

1. Architecture, Archaeology, and Smart Cities: A New Vision in the Digital Age
2. Sites and Emotions, a synergetic dialogue between psyche and environment
3. The new language of architecture

Lesson: **Alberotanza**

1. UNESCO sites and digital, how can you visit them! Theory and case studies;
2. Cultural Routes and digital

Lesson: **Calzolaio**

1. The Faro Convention and the Platform of Patrimonial Communities: an example to follow

*Module XI: Smart Cities and Cultural Heritage - Archaeology and Museums in the New Digital Era*

Lesson: **Angelini**

1. Architectural and archaeological surveying: the latest range-based and image-based techniques
2. Light laser, scanner acquisitions and photogrammetric techniques
3. Topographic techniques and GNSS/GPS systems
4. 3D data management and following phases: pre-processing, registration of scans, georeferencing of a numerical model, transformation of surfaces, metric analysis
5. Case studies projects carried out by RDR Lab

Lesson: **De Caro**

1. Analytic Techniques applied to the study of cultural heritage;

Lesson: **Gigliarelli**

1. Constructive HBIM: The National Archaeological Museum of Naples. HBIM and Seismic Vulnerability: BIM and VPL for assessing the mechanical characteristics of masonry. The Sismi project and the case study of Cornillo in the seismic crater of Amatrice
2. HBIM for Energy Efficiency and Environmental Analysis of Historic Buildings: The BEEP project – the case study of Palazzo Maffei Borghese in Rome. The METRICS project and the historical center of Frigento
3. HBIM at Urban and District-Scale: The Prosit project and the case study of San Giovanni a Teduccio. The PRIN TECH START project and the National Archaeological Museum of Ferrara.
4. HBIM and SMART MUSEUMS: HBIM, IoT, and AI – The HBIMXLAZIOHERITAGE project and the case study of the Chostro del Bramante in Rome. HBIM for Conservation and Maintenance of Museum Works: The Ideha project and the case study of the Real Site of Carditello and the former Tonnara di Favignana
5. Semantic HBIM for BUILT Heritage (at both the archaeological and architectural scales) : The Maeci project and the case study of the Monastery of Santa Maria Goranxi in Albania. The archaeological site of the Dam Pagoda in Vietnam

Lesson: **Sartori**

- 1 Musealisation and the new digital era

*Module XII: Cyber Security*

Lessons: **Mercati**

1. Cyber security definition;
2. Cyber and Security International Context
3. Cyber and Security Threat Landscape evolution and impact on Smart city
4. What Europe is doing in the cyber domain
5. Cyber Security general principle requirements and standards
6. Cyber Security Assessment analysis and technique
7. Cyber security applied to a Project life cycle
8. Conclusion

Lessons: **Calaprice**

1. EU Strategy for Cyber Security
2. EU Strategy for Artificial Intelligence

*Module XIII: Circular Economy*

Lesson: **Polini**

1. Concept and Principles of Circular Economy;
2. Reflection on economy, environment, and territory;
3. The waste cycle;

4. Rethinking the production chain and the waste system: an opportunity for new generations;

Lesson: **Vitali**

1. Circular economy and energy transition: the city as an urban mine. The FAAM experience

*Module XIV: Soft Law and Smart Cities – Agile Work*

Lesson: **Varricchio**

1. Legal Aspects of Smart Cities
2. Smart Cities and Smart Working
3. Teleworking and Smart Working
4. Legal profiles and the differences between the 2 figures
5. Smart Working and a sustainable environment
6. The worker and his rights in the smart working society
7. The right to disconnection
8. Possible future scenarios
9. Conclusions;

Lesson: **Agbo**

1. Understanding International and Comparative Law (ICL)
2. The concept of Law
3. Divisions of Law (Natural/Positive; Public/Private)
4. International Law and its division (Public, Private, Customary)
5. Comparative Laws (Concepts, contents, methods, and objectives)
6. The concept of Emerging Technologies (ETs)
7. Technology: Traditional and Emerging
8. Four Major Emerging Technologies (AI, Blockchain, Internet of things, Robotics)
9. International laws and regulations of ETs (International: UN and its Agencies; Regional: EU, OAS, AU, As Pacific)
10. Specific international laws and regulations of Smart City,
11. Problems and Prospects of International and Comparative law

*Module XV: Transhumanism, Digital Ethics*

Lesson: **Cascio**

1. From logic to artificial intelligence;
2. Classical logic and its relationship with speculative and formal logic: development and use in programming languages;
3. Python and its machine learning library Scikit-learn;
4. Machine learning: creation of systems capable of learning and self-improvement based on incoming data;
5. Big Data and Artificial Neural Networks: the most popular computational model for solving common AI problems;

*Module XVII: Urban Planning and Sustainability*

Lesson: **Soldi**

1. Why Agile is a key capability for organizations to embark on the journey towards Sustainability and Circularity?
2. *Sustainability and the Agile Mindset*: a shared system of values and principles;
3. Developing Sustainable Products and Services through Agile Scrum;
4. Being adaptive also at the Strategy level;
5. Sustainable goals setting through OKR;
6. Sustainable Strategy Execution with Lean Portfolio Management;

Lesson: **Zilli**

5. Sustainability and Technologies in Smart Cities;
6. Urban Sustainability: Concepts of sustainability and importance in cities;
7. Sustainability Indicators: Discussion of key indicators for assessing sustainability in a smart city;
8. Technological Solutions for Sustainability: Examination of advanced technologies used to address environmental challenges in cities: IoT, Blockchain, Artificial Intelligence, Cloud, and others;
9. Renewable Energy: Insight into renewable energy sources in Smart Cities;
10. Sustainable Mobility: Discussion on technologies and initiatives to promote sustainable public transport and shared mobility;
11. Holistic Approach to Sustainability: How digital technologies, innovation, and sustainability fit into a holistic approach to Smart Cities;

## *Module XVIII: Blockchain*

Lesson: **Pescatore**

1. Role of technology in shaping urban environments: Key challenges: security, privacy, and efficiency
2. The Role of Data in Smart Cities: Methods of data collection, storage, and processing
3. Importance of secure data management
4. Cybersecurity Fundamentals for Smart Cities: Identification of cybersecurity threats specific to urban environments: exploration of protection layers and essential tools
5. Blockchain Basics and Its Applications in Smart Cities: understanding Blockchain technology: transparency, immutability, and decentralization
6. Practical applications in supply chain management, digital identity, energy management, and smart contracts
7. Integrating Blockchain for Secure Smart Cities: Benefits of integrating Blockchain: transparency, trust, reduced fraud, and improved public service efficiency
8. Examination of challenges: scalability and regulatory considerations
9. Real-life case studies of successful integration
10. Blockchain in Managing Cybersecurity Risks for Smart Cities: Identifying vulnerabilities within Smart City systems and implementing risk assessment and mitigation strategies using Blockchain
11. Preparation for incident response and recovery plans in the event of a cyber threat

## *Module XIX: Geographic Information System (GIS)*

### Lesson: **Bhattacharjee**

1. "Foundations of Earth Observation and GIS for Smart Cities"
2. Earth Observation and GIS. Technologies of smart cities, role in data acquisition, analysis, and decision-making.
3. Introduction to GIS software programs like QGIS;
4. Practical Examples and Case Studies;
5. "Real-World Applications of Earth Observation and GIS in Cities";
6. Practical examples and case studies;
7. Earth observation and GIS applied in urban environments: from urban planning to environmental monitoring;
8. "Hands-On Workshop: Designing Smart Solutions for Cities". Problem-solving skills  
Application of software QGIS

## *Module XX: Case studies*

### Lesson: **Adbellatif**

1. The Paradigm Shift in the GCC emerging TOD Practices;
2. Saudi Arabia Greening and Humanization Practices in Urban and Regional Planning;

### Lesson: **Nkafu**

1. *Digital Bridge*: a technological bridge between Italy and Cameroon;

### Lesson: **Petrucci**

1. Riyadh Smart City and Amburgo Smart City;

### Lesson: **Bhattacharjee**

3. Urban Environment for Smart Cities.
4. Case Study in Urban microclimate simulation: Prague and other cities
5. Discussions and exercise

### Lesson: **Caviasca**

1. Architectural solar smart poles for Smart cities;