

**EXECUTIVE MASTER IN CARBON NEUTRAL AND RESILIENT CITIES - ULB-
2023-2024**

Session	Date	Time	Sched.	Modules	Methodologies	Learning Acquis	Course description
				Module 1: Introduction to the concept of resilient and carbon-neutral city			
1.1	12-09-23	09.30-12.30 / 14.00 -16.00	1h15 + pause + 1h15 / lunch	introduction to the Executive Master, general notions of urban resilience and current challenges of urban humanity / Presentation of each partner - ULB ENGIE UNH Tractebel	on-site session with topic presentation and interactive discussion - keynote presentations and workshop at ULB and Tractebel	Urban Resilience and carbon-neutral cities are recent forward looking urban trends - this session will introduce, identify and describe the notions of resilience and circular economy at the urban and territorial level.	introduction to the Executive Master, general notions and current challenges of urban humanity - EU/global references of urban resilience and urban innovation, case studies, EU and global policies
1.2	13-09-23	09.00-12.00 / 14.00 - 18.00	1h15 + pause + 1h15 / lunch	Visit Tractebel office + meeting cities team including cityscan 360 UTC Urban Thinkers Campus - Auditoire ULB		Understanding of practice and project management system, How to use cityscan methodology applied to projects Urban Thinkers Campus of World Urban Campaign - ULB Bourgeois	presentation of Tractebel office Brussels North, presentation portfolio and projects, project management international event supported by WUC, https://www.worldurbancampaign.org
1.3	14-09-23	09.00 - 12.30	1h15 + pause + 1h15 / lunch	Master Thesis presentation + Selection topics + Groups formation Applied Project management demonstration		Understanding TFE hot research topics and challenges, how to present a research question Applied Project Management in contemporary case study, Mobility concept Antwerp	presentation and discussion of resilient and carbon-neutral research topics, selection of TFE topics and formation of TFE groups / lecture on applied project management
1.4	19-09-23	16.00 - 19.00	1h15 + pause + 1h15	New technologies - Intelligent Cities and Artificial Intelligence - Power of Urban Innovation	online session with topic presentation and interactive discussion - keynote presentations	Artificial Intelligence and New Technologies are transforming fundamentally our way of living and working, but also the urban systems. This session will describe current trends, compare new technologies and explain how they influence our current and future urban ecosystems.	Intelligent territories, urban innovation, future of urban humanity: how cities will be by 2050?
1.5	26-09-23	16.00 - 19.00	1h15 + pause + 1h15	General Project Management techniques			
				Module 2: Materials, resources and Energy dimensions in urban fabric			
2.1	03-10-23	16.00 - 19.00	1h15 + pause + 1h15	Energy markets energy mix in Europe Decentralisation of urban energy (I)	online session with topic presentation and interactive discussion	Introduction of Energy markets in Europe. Debate on the energy mix in Europe. Overview of issues, challenges and solutions related to the decentralisation of urban energy: why is decentralisation important? How can energy be sustainably generated and distributed in urban contexts?	Technical description of the energy flows: production and origins, distribution. Debate on the energy mix in Europe. Description of challenges and opportunities of decentralised energy
2.2	10-10-23	16.00 - 19.00	1h15 + pause + 1h15	Low CO2 materials Decentralisation of urban energy (II)		Description of low carbon materials, with a focus on low carbon concrete. Overview of decentralisation of urban energy: How can energy be sustainably generated and distributed in urban contexts?	Focus on low carbon concrete applied to the urban system Overview of modes of distribution of decentralised energy; Case studies
2.3	17-10-23	16.00 - 19.00	1h15 + pause + 1h15	Low carbon architecture - green architecture Positive Energy Districts, Energy efficiency approach		technologies of low carbon architecture, management of local resources Energy efficiency approach, resilient energy districts,	How to achieve low carbon architecture, resilient architecture by design Sustainable energy production and consumption. Concept of PED and BCV in urban system.
2.4	24-10-23	16.00 - 19.00	1h15 + pause + 1h15	Local Resources and biosourced materials - construction materials - concrete - briks - building technologies - Wood technologies - bioclimatic buildings		How to manage local resources, and how develop an efficient energy approach? The session will help to focus on understanding, discussing and comparing local resources and materials, as well as innovative building technologies	The session will give the tools to understand the use of local resources - Bioelements and more.
				Module 3: Net-zero Approach			
3.1	07-11-23	16.00 - 19.00	1h15 + pause + 1h15	Carbon performances - Carbon neutrality concept, Net zero, Offsetting for Buildings and Industries	online session with topic presentation and interactive discussion	Definitions of Net zero, Carbon neutrality, Offsetting for Buildings and Industries. Case Study Faurecia	Technical definitions, importance of governance and how to finance net zero buildings and industries. Providing a concrete example
3.2	14-11-23	16.00 - 19.00	1h15 + pause + 1h15	Net zero urban fabric & Urban Climate		Net zero urban fabric in developed and developing countries : promoting integrated approaches, including circular economy, waste, mobility infrastructure, building forms, water and energy infrastructure	Concrete examples to promote net zero urban fabric : solutions and case studies, best practices, evidence-based solutions
3.3	21-11-23	16.00 - 19.00	1h15 + pause + 1h15	Low-carbon mobility - Concrete application of carbon balance calculation		Low-carbon mobility and its carbon balance dimension are key towards net zero cities: how to design and implement? The session will describe different methods and case studies of successful mobility systems globally	Technical description of mobility schemes, mobility carbon balance, alternative fuels mix, TOD methodology, urban fabric density with best practices
				Module 4 : Carbon-neutral methodologies and tools			

4.1	28-11-23	16.00 - 19.00	1h15 + pause + 1h15	Masterplanning for resilient cities	online session with topic presentation and interactive discussion	Planning climate adaptation, crisis management, build back better in both developed and developing countries. The session will describe concrete examples, share return on experience and provide recommendations	Description of resilience master plans in different geographies. Return on experiences.
4.2	05-12-23	16.00 - 19.00	1h15 + pause + 1h15	Masterplanning for net zero cities		Planning and transforming built environment and greenfield city development together with energy and positive energy systems, low carbon materials, low carbon mobility, net zero buildings and industries. The session will describe the management of urban climate and Energy Masterplanning , providing concrete examples	Technical description of all urban flows and strategic development of carbon-neutral concepts. Use of indicators and assessments methods, reporting and ex-post analysis. Carbon footprint operations. Life cycle assessment for low carbon buildings and cities
Module 5: Nature-Based Solutions and Green Infrastructure							
5.1	12-12-23	16.00 - 19.00	1h15 + pause + 1h15	Vegetalisation systems - Carbon Capture systems	online session with topic presentation and interactive discussion	Vegetalisation of the urban fabric and urban forests are key to capture carbon emissions and equilibrate the urban climate	Technical description of carbon capture operated by green systems, notions of urban climate and "green". Nature based solutions solutions and techniques. Legal framework
5.2	19-12-23	16.00 - 19.00	1h15 + pause + 1h15	Green Infrastructure development and management - Advanced natural and environmental resource economics		Green infrastructure has to be further developed in urban systems to make the city more resilient. Nature-based Solutions are today the reference for urban resilience. How urban ecosystem services can be designed and implemented? The session will deliver developing green infrastructure approach and urban ecosystem services	Technical description of green infrastructure implementation: core zones and corridors, ecosystem services indicators, evaluation and design
Module 6: Implementation and financing the carbon-neutral city							
6.1	09-01-24	16.00 - 19.00	1h15 + pause + 1h15	Mutualisation techniques - Governance and stakeholders identification and management	online session with topic presentation and interactive discussion	Resilience & net zero can only be achieved with involvement of stakeholders - how to develop sustainable governance and develop co-creation processes? The session will deliver the necessary tools and strategies towards integrated governance approach	Technical description of stakeholders involvement - participation techniques. Co-creation and Co-design principles. Citizens engagement
6.2	16-01-24	16.00 - 19.00	1h15 + pause + 1h15	Financial management of carbon-neutral city - Scientific evaluation - Carbon calculation		Net zero strategies need financial support. How to understand, use and implement financial management of carbon dimension? The session will deliver some interesting aspects in funding opportunities and solutions	Technical description of financial aspects, carbon capture benefits, win win systems, quantification of carbon interventions, crowdfunding
6.3	23-01-24	16.00 - 19.00	1h15 + pause + 1h15	INNOVIRIS one hundred carbon neutral cities - Brussels		How to achieve a net zero city - Brussels as an example	technical description of implementation measures at city and regional level
6.4	30-01-24	16.00 - 19.00	1h15 + pause + 1h15	Financial management of carbon-neutral city - PPPs and other financial forms		Resilient and net zero strategies need innovation funding solutions. Examples and closing remarks	Financial strategies: flows, RoI, climate balance, carbon-neutral benefits - case studies and best practices. Conclusions
Module 7 : Master Thesis TFE							
7.1	February - May 24	3 - 4 sessions		Master Thesis			
Module 8 : Master Thesis (TFE)							
	June 2024				60 pages work	Defense TFE + conclusion conference début Juin 2024 - 2 days	