Urban Climate Change Research Network for Higher Education
Climate-Resilient Design, Planning and Governance of Cities

Co-funded by the Erasmus+ Programme of the European Union

UCCRN_edu Virtual Learning Environment and MOOC

Project Result Lead Partners: Universitat Internacional de Catalunya and Aalborg Universitet

UCCRN_edu — Virtual Learning Environment and MOOC

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UCCRN_edu "Urban Climate Change Research Network for Higher Education: Climate-Resilient Design, Planning and Governance of Cities" is a project co-funded by the Erasmus+ programme of the European Union (proj. n. 2021-1-IT02-KA220-HED-29D94D03).
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This work shall be cited as follows
Chelleri, L., Lehmann, M., Leone, M.F., Campese, D., Nocerino, G., Addabbo, N., Pellegrino, M., Barroca, B, Pacteau, C., Valentin, C. Gignoux, J., Lehmann, M., Dalum Bøgh Jensen, A., Mills, G., Bisgrove, E., Rijana, V., Pierson, M., Deshayes, E., Becue, V., Koutra, S., Lago, N. Sobcak, F., Veerbeek, W., Raven, J. (2024).
UCCRN_edu Virtual Learning Environment and MOOC. Available at: www.uccrn.education

Authors: Lorenzo Chelleri, Martin Lehmann, Mattia Federico Leone, Daniele Campese, Giovanni Nocerino, Nicola Addabbo, Margot Pellegrino, Bruno Barroca, Chantal Pacteau, Christian Valentin, Jacques Gignoux, Martin Lehmann, Astrid Dalum Bøgh Jensen, Gerald Mills, Ernest Bisgrove, Valeria Rijana, Maxime Pierson, Eloise Deshayes, Vincent Becue, Sesil Koutra, Noémie Lago, Fabrice Sobcak, William Veerbeek, Jeffrey Raven
Editing and proofreading: Mattia Leone, Enza Tersigni, Valeria Granillo
Layout: Valeria Granillo
Images: Images provided by the UCCRN_edu Partners (images credits in the caption)

This publication is the outcome of in-depth consultations undertaken by the Erasmus+ UCCRN_edu project team:

Project Partners

Universitá degli Studi di Napoli Federico II
Main coordinator: Mattia Leone
Key partners: Giulio Zuccaro, Pietro Nunziante, Enza Tersigni, Cristina Visconti, Maria Fabrizia Clemente, Sara Verde, Marion Perney, Daniele Campese, Giovanni Nocerino, Nicola Addabbo, Valeria Granillo

Université Gustave Eiffel
Local coordinator: Margot Pellegrino
Local partners: Bruno Barroca, Angela Ruggiero, Maria Baresch

Sorbonne Université
Local coordinator: Chantal Pacteau
Local partners: Christian Valentin, Loic Segalen, Jacques Gignoux, Emmanuel Gendreau, Pierre Lacaze, Hanna Hertwig, Séverine Maillet

Aalborg Universitet
Local coordinator: Martin Lehmann
Local partner: Astrid Dalum Bøgh Jensen

University College Dublin
Local coordinator: Gerald Mills
Local partners: Eve Brosseau

Universitat Internacional de Catalunya
Local coordinator: Lorenzo Chelleri
Local partners: Ernest Bisgrove, Allison Ahern, Raquel Guerra, Valeria Rijana, Maxime Pierson, Eloise Deshayes

Université de Mons
Local coordinator: Vincent Becue
Local partners: Sesil Koutra, Noémie Lago, Fabrice Sobcak

Università di Pisa
Local coordinator: Alfredo Fioritto
Local partners: Marco Lunardelli, Marco Bevilacqua, Gabriele Serra

IHE Delft Institute for Water Education
Local coordinator: Chris Zevenbergen
Local partners: William Veerbeek, Fred Toet

Associated Partners

Higher Education Institutions
COLUMBIA – Columbia University (USA)
DRX – Drexler University (USA)
PUC-RIO – Pontifícia Universidad Católica do Rio de Janeiro (Brazil)
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International Networks
UCCRN
UCCRN European Hub
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URNet
ICLEI
Climate Chance
Cité-ID – Gouvernance de la résilience urbaine
ACAN – Architects Climate Action Network

Local Authorities
Ethekwini Municipality (South Africa), and UCCRN African Hub

SME
Raven Architecture + Urban Design + Sustainability (USA)

Introduction

The UCCRN_edu Virtual Learning Environment (VLE) and collaborative platform is the primary tool for implementing UCCRN_edu activities. It represents the central repository of project results and communication channel for all the involved students, teachers, and staff. The platform is available at www.uccrn.education/elearning.

The primary aim of the UCCRN_edu VLE is to provide students with easy and digital access to their teaching/learning materials. This includes the UCCRN_edu MOOC, literature links and open-access references, schedules, tasks, and assignments. The platform also integrates tools for streaming (and recording) live online course lectures, with the added benefit of remote student interaction, thereby optimising the blended mobility opportunities within UCCRN_edu courses.

By integrating innovative visual tools (e.g., Miro collaborative board), the UCCRN_edu VLE not only serves as a repository of information but also as a dynamic design studio tool. This allows for interaction among students enrolled in the 3 UCCRN_edu Courses and fosters teamwork during the preparation phases of the Urban Design Climate Workshops.

Further important communication functionalities are included, such as discussion forums, feedback tools, chats, etc., to allow systematic interaction between students and staff.
The complete integration of communication and collaborative design tools in the E-learning Platform is essential to performing joint periodic and final critiques of UNINA, UIC, and AAU students' works, which also involves the participation of Associated Partners and external stakeholders.

The UCCRN_edu VLE is designed to address the primary need emerging from more than one year of "forced" distance learning in HEIs due to the COVID pandemic. It aims to overcome the limited community and relationship building that often occurs when virtual tools are used only for frontal lectures and to collect students' works. Instead, the VLE fosters teacher-student and student-student relationships, strengthening

critical and creative thinking and enhancing communication and interpersonal skills, which are crucial for effective collaboration.

The platform is made accessible to students enrolled in UCCRN_edu Courses and/or participating in the blended mobility program archiving and external participants within the Intensive Study Programmes.
These users have limited access to the Virtual Learning Environment through specific web links relevant to the activities to be carried out. Upon demand, access to the UCCRN_edu VLE can be granted to all the Associated Partners and external networks participating in the Multiplier Events (with possible access restriction) as a helpful dissemination channel. In particular, a potential synergy is identified in collaboration with MIT for the follow-up of the course “Cities and Climate Change: Mitigation and Adaptation” held with the support of UCCRN at the Department of Urban Studies + Planning (first edition Spring 2020, coordinated by J. Knox-Hayes and C. Rosenzweig).

The successful implementation of the UCCRN_edu VLE is particularly relevant for the follow-up and scaling-up of the initiative, e.g., within a future UCCRN_edu European University, since it will also be used as a promotion channel towards external HEIs interested in joining the initiative in the future. Its design and functionality will be targeted towards an optimal user experience, reducing technical complexity where possible.

The structure of the UCCRN_edu Virtual Learning Environment has jointly developed by AAU, UNINA, and UIC, who are the Partners in charge of implementing the three UCCRN_edu Courses and the platform’s primary users. A preliminary survey conducted during the drafting of the application identified Microsoft Teams as the technology provider for the e-learning platform, which is already in use by these three HEIs and provides all the functionalities targeted by the project. The Microsoft Teams tool is integrated into other virtual collaborative enviroments to maximise the access and usability of UCCRN_edu educational resources in diverse contexts.

During the preparatory activities, a preliminary requirements analysis has been conducted among all the Partners to design the platform’s features and the main technical specification for customising Microsoft Teams for the identified needs.

Table of Contents

1.

Overview on the MOOCs and the Available Online Platforms

1.1 Background

Massive Open Online Courses (MOOCs) are free online courses available for anyone to enrol in. They offer a financially feasible means of acquiring new skills, advancing one's career, expanding knowledge in a specialised field, and providing quality educational experiences on a large scale.
Millions worldwide use MOOCs to further their education for many different reasons. These reasons include career advancement, changing careers, college preparation, supplemental learning, lifelong learning, corporate eLearning, and training. MOOCs have profoundly impacted how people around the world acquire knowledge.

1.2 State of the Art: Which the Online Education Platforms Are and How They Work

The COVID-19 pandemic that broke out worldwide brought about a shift in how educational systems approached their work. The usual methods of making education available through the various courses offered by these institutions were disrupted by prolonged periods of lockdown that were followed by the closing of schools, colleges, and other educational institutions.
The market for MOOCs is predicted to prosper, in contrast to most other markets, which are still battling to recover from the COVID pandemic. The total money made from selling MOOCs worldwide exceeds $7.55 billion between 2017 and 2021. (Global Wire News)
This report highlights the main MOOC platforms that are used globally. By analyzing the costs, resources, and benefits of each platform, we can better understand how the UCCRN can successfully enter and thrive in this dynamic market.

1.3 How to Create a MOOC

The production and development of MOOCs vary a lot between courses and topics. The amount of money invested is typically depending on factors such as:

- staff cost
- length of the MOOC (e.g., 4 or 12 weeks)
- hours of video material produced
- the production of further cost-intensive resources, such as graphs, animations, overlays, etc.
- post-production services
- existing knowledge and experience
- existing equipment
- content availability prior to course production

Our analysis reveals a significant variability in the development costs for MOOCs, making them challenging to estimate. These costs can range between $40,000 and $325,000 for each course, encompassing all associated expenses.

These numbers might sometimes be lower without considering staff costs and initial investment (studio, etc.) costs. In addition, about $10,000–$50,000 are needed as operational costs for teachers, assistants, and mentors for every course running on a MOOC platform. Additional costs are needed for the MOOC platform, such as a fee (annual or per MOOC) for a partnership with a MOOC provider, marketing, etc.

Understanding the Business Model for the UCCRN_edu Platform is critical since the MOOC education models are complex. From the full Report on Business models for Online Education (see https://www.researchgate.net/publication/314950632_BizMOOC_Discussion_paper_07_Existing_MOOC_business_models), we highlight that "there are many versions of business models. Al-Debei (2008) identified four primary dimensions, while Yoram (2014) comprised the following three components: (1) Customer Value Proposition, (2) Infrastructure (both resources and processes) and (3) Financial Aspects. However, the economic models cannot be applied to open licences and free resources like Open Educational Resources (OERs) and some parts of MOOCs (Stancey,

2015). Stancey argues that the classic economy is based on scarcity, while OERs and MOOCs are based on abundance at no cost. Thus, completely different approaches might be needed."

A business model adapted from Canvas for MOOCs could look like this and deserves a comprehensive discussion among the UCCRN_edu Coordinators and HIE Partners. This is because of its complexity in terms of the long-term management of the certificates and launching of the courses (though not fully delegated to an online platform like Coursera, edX, or others).

Table 1. A model to illustrate the pahases of a MOOC, its various stakeholders, and costs and revenues.

	Analysis (1) →	Course Production →	Implementation →	Course Delivery →	Evaluation & Research
Stage Description	Analysis of the market demand, target groups etc.	MOOC Production (Didactics, Video/Text Production, Post Production etc.)	Implementation of the course on the MOOC platform	**Supply Side:** Who provides the course?	**Demand Side:** Who is studying the course?	Analysing data, collecting feedback etc.
Stakeholders	- Course Producers - MOOC Platforms	- Higher Education Institutions (HEI) - Companies - Non Profit Organisaitons - Governmental Organisations - Others (NGO's, EU, UN etc.) - Course Production Companies	- „Plaform Only" (Coursera, iversity, edX etc.) - Platform part of an organisation/ HEI	- Content & Platform providers - Examination providers (Software, On Site)	- HEI Students - Live Long Learners - Company & Organisation Employees - Global Public etc.	- Course Producers - MOOC Platforms - Research Institutions
Cost (2)	- Staff cost (research)	- Direct Course Production Cost - Staff Cost - Post-Production - Operational Cost - Opportunity Cost etc.	- Initial Investment (seting up the platform) - Staff Cost - Operational Cost	- Marketing - Fees for Proctorig Software - Examination Fees, Correction fee	- Statement of Participation (SoP) Fee - Certification Fee - Additional Services (3)	- Research Cost
Revenue	-		- Public Funding (e.g. FUN) - Private (e.g. VC) funding (Courera, iversity, Udacity etc.) - Cross-financing (e.g. Futurelearn, Open HPI)	- Sponsoring / Branding (4) - SoP Revenue - Certificates - Sponsoring / Branding - Additional Services (3)		- Post Course Services (Learning Analytics etc)
Non direct monetary drivers	- Research Insights	- Improve/Scale onsite Teaching for HEI		-Branding, Marketing or recruitment for a company or HEI - (...)	- Human Capital / Knowledge (non-direct monetary)	- Research Insights

As such, to make the free online courses appealing, UCCRN_edu could offer a set of complementary services. Indeed, most EU-funded project capacity-building courses fail to meet the audience in the long term. This is a crucial factor to consider since the sustainability of the online education products delivered by UCCRN_edu wishes to last, be upgraded, and reach as many scholars and practitioners as possible globally. Thus, it is critical to understand those business models to make the online courses appealing.

These additional services that can be derived from MOOCs' free offerings can be:

- formal certificates from UCCRN_edu
- statement of participation delivered from UCCRN_edu
- individual coaching/tutoring during the MOOC
- tailored specialisation courses for employees as part of professional development training (e.g., Small Private Online Course (SPOC) based on the MOOC)
- tailored (paid for) follow-up resources based on participants' data in MOOC
- ECTS or other HEI-credit points in MOOCs (consider the Masters' from HIE UCCRN_edu Partners validating ECTS to their students if they are coursing the UCCRN MOOC)

However, a key aspect in developing the UCCRN_edu online platform is to strategically outline what could be funded by the current Erasmus+ in terms of online courses or webpages (its own online platform) and which further courses and mechanisms need extra funding. This strategic planning, part of a longer-term strategy for the success and sustainability of the education platform, is designed to instill confidence in the audience about the project's future success.

2.

Analysis of the Available MOOC Platforms

2.1 edX

edX is particularly **effective for short courses**

Edge supports **Small Private Online Courses**

Edge courses **do not provide certifications**

Overview:
- 3600 courses
- 42 million users, 110 million enrolments
- mainly English (some courses are offered in Spanish, French, or Chinese with English subtitles)

Types of partners:
Research universities, non-profits, NGOs, and multinational corporations with MicroMasters program.

Services provided to the course issuer:
EdX offers a range of services to the Course Issuer, including training, onboarding, program management, learner technical support, course strategy, design/build/run consultations on data analytics. Notably, edX is particularly effective for short courses, outperforming the other platforms introduced in this document.

Information relevant to the design of the UCCRN_edu e-learning platform:
- **edX** (edx.org) hosts MOOCs from edX institutional partners. An agreement with edX is needed to publish a course on edx.org. Courses on edx.org are publicly listed in the edX course catalogue and open to learners worldwide.
- **Edge** (edge.edx.org) offers a more private and exclusive learning environment than edx.org. It supports Small Private Online Courses (SPOCs), ensuring a sense of privacy and control. Edge has no course catalogue, and the course page is hidden from indexation. Only learners with an invitation or the URL can take an Edge course, further enhancing the sense of exclusivity. An infinite number of learners can be invited to an Edge course. Edge courses do not provide certifications.

UCCRN_edu should take the initiative to officially request a partnership inquiry with edX to determine the pricing of hosting a course on the platform. The only information available is that we must make a financial contribution back to the host, so it is impossible to obtain further information and tips for developing our courses' business models and potential partners within this state-of-the-art report.

2.2 Coursera

12 languages available!

Coursera: the best choice for **providing a full university degree online**

Overview:
- 10,000 courses
- 142 million users/enrolments
- 12 languages (edX is mainly English, so Coursera could reach a broader audience)

Coursera's educational tracks offer a spectrum of learning options, from job skills/industry tools to general knowledge, specialisation, professional certificates, university-issued certificates with credit towards a degree, and the opportunity to earn a full bachelor's or master's degree.

Information relevant to the design of the UCCRN_edu E-learning Platform:
This platform will be the best choice if the main goal is to provide a full university degree online. In that case, UNINA, UIC, or another HIE need to help with the partnership agreement with Coursera. This could be an option to explore, as in the case of the inquiry for partnership pricing with edX mentioned above.
To clarify what could be done through Coursera, the same EIT Urban Mobility hosts courses on this channel. UCCRN_edu could set up a complete postgraduate course on Coursera in the future, starting a first short online MOOC within this Erasmus+ on edX, which would be considered the intro for an entire course to be offered through Coursera.

2.3 Udemy

Overview:

- 26,200 courses
- 75 million users, 833 million enrolments
- 74 languages

Udemy offers **resources and tutorship on creating an online course**

74 languages available!

Information relevant to the design of the UCCRN_edu E-learning Platform:
In this case, Udemy is broader than the previous platforms, and consequently, the potential agreement is more complex, leading to multiple options being negotiated. Indeed, these could be the steps to be followed. UCCRN_edu could plan our own curriculum and forward it to Udemy, which provides instructors with resources and tutorship on creating an online course and successfully launching and managing it.
Course prices vary a lot, from just $12.99 to $199.99.
The business model of Udemy is based on charging instructors a fee for every course sale made on its platform. The fee ranges from 3 to 75 per cent and depends on how the user was acquired. Indeed, sales occur through the instructors' promotion: instructors receive 97% of the revenue when students purchase their content using an instructor's coupon or referral link. This could be promoted and forwarded through the UCCRN_edu website and social media channels. On the contrary, sales that do not occur through an instructor promotion: instructors receive 37% of the revenue for any Udemy sales where no instructor coupon or course referral link was used. These sales might occur after a user clicks on a Udemy advertisement or browses the Udemy marketplace for courses.

2.4 The City Resilience Training (CRT) Platform

Supported by the United Nations Economic Commission for Europe (UNECE), the CTR is a new online platform for disseminating short introduction courses. It focuses on 4 topics: Informal settlements, Economic resilience, SDGs localisation and Urban Transition.

Overview:
- 10 courses
- 810 enrolments
- mostly in English (with some classes in Russian)

The CRT platform: an excellent **independent course platform**

The UN Platform is an excellent example of an independent course platform. Each course on the platform follows a specific structure. The content is presented in straightforwardly, often through an interactive PowerPoint presentation with a pre-recorded voice-over. Every 5–10 slides, users are prompted to engage with the content, whether it is through a knowledge test, reading a source, or other activities.

Following this structure will give UCCRN_edu a greater degree of control over content delivery and complete independence on profits, should they choose to charge for the course. This structure should be a priority for UCCRN; however, maintaining the domain will take extra resources.

2.5 Integration of Featured Content from Existing Courses

This section presents the marketing analysis results of currently available courses. It is crucial to align with them, not replicate content, but try to establish a partnership, advertise them as falling within UCCRN_edu scope, and create content that will complement the current offer.
Below is a list of successful courses from different online platforms on topics similar to those UCCRN_edu is working on (urban sustainability and resilience). Links are provided to help understand the courses' structure (contents split into modules) and the quality of the layout and information offered.

2.5.1 edX

- **Sustainable Cities** hosted by SDG Academy
  - Duration: 9 weeks (4–6 hours per week)

- Cost: free
- Topics:
  - An overview of governance, land management, utilities, and other entities that create urban systems
  - Understanding how poverty, health, economic opportunity, and other people-focused issues impact urban systems and development
  - How technology is shaping transportation, energy, urban resilience, and more
  - Case studies of major cities in the Global North and South
- Link: https://www.edx.org/learn/sustainability/sdg-academy-sustainable-cities

- **Rethink the City: New Approaches to Global and Local Urban Challenges** hosted by TUDelft
  - Duration: 6 weeks (3–4 hours per week)
  - Cost: free or verified track with a shareable certificate upon completion ($163.00)
  - Topics:
    - Alternative theories in spatial justice, housing provision and management, and urban resilience
    - Application of analytical tools and innovative solutions to contemporary urban challenges
    - Developing a critical perspective about your urban environment
    - New perspectives to understand and analyse the urban challenges of the Global South
  - Link: https://www.edx.org/learn/urban-planning/delft-university-of-technology-rethink-the-city-new-approaches-to-global-and-local-urban-challenges

- **Urban Upgrading for Inclusion, Sustainability and Resilience in a Time of Global Pandemics** hosted by World Bank Group
  - Duration: 9 weeks (4–5 hours per week)
  - Cost: free or verified track (€5.00)
  - Topics:
    - Understanding urban slums, their underlying social, economic, and spatial characteristic, how they emerge and consolidate, and make an impact on local communities and the city as a whole
    - Analysing the evolution of policy approaches to address urban slums under different contexts, what worked, what did not work, and why
    - Reviewing and applying key operational principles and instruments for designing an upgrading intervention, including planning, finance, infrastructure, land tenure, housing, social inclusion, and sustainability
  - Link: https://www.edx.org/course/urban-upgrading-for-inclusion-sustainability-and-resilience-in-a-time-of-global-pandemics

- **Other programmes**
  There are 3 urban sustainability 'programmes that consist of 2–4 courses taken in conjunction with each other. All the programmes include a professional certificate to be purchased from $27.00 to $557.00.
  - **Interdisciplinary Sustainable Architecture Assessment** hosted by Universitat Politècnica de València (see https://www.edx.org/course/sustainability-in-architecture-an-interdisciplinar)
  - **Inclusive and Sustainable Cities** hosted by TUDelft (see https://www.edx.org/course/sustainable-cities-2)
  - **Climate-Neutral World: Theory, Applications and Taking Action** hosted by TUDelft (Professional course) (see https://www.edx.org/certificates/professional-certificate/delftx-climate-neutral-world-theory-applications-and-taking-action#program-enrolling-now-section)

2.5.2 Coursera

- **Sustainable Cities and Communities Specialization** hosted by Lund University
  - Duration: 4 weeks (10 hours per week)
  - Cost: free to audit, or €47.00 to purchase the course and certification
  - Topics:
    - Greening the economy

        - Urban nature: connecting cities, sustainability and innovation
        - Cities and consumption
    - Link: https://www.coursera.org/specializations/sustainable-cities

- **Management of Urban Infrastructures** hosted by Ecole Polytechnique Fédérale de Lausanne
    - Duration: 12 hours, flexible deadlines
    - Cost: free to audit, or €47.00 to purchase the course and certification
    - Topics:
        - Introduction to urban infrastructures
        - Urban energy management
        - Urban transport management
    - Link: https://www.coursera.org/learn/managing-urban-infrastructures-1

- **Smart Cities- Management of Smart Urban Infrastructures** hosted by Ècole Polytechnique Féderale de Lausanne
    - Duration: 13 hours, flexible deadlines
    - Cost: free to audit, or €47.00 to purchase the course and certification
    - Topics:
        - Smart urban energy systems
        - Smart urban transportation systems
        - Towards smart cities, parts 1 and 2
    - Link: https://www.coursera.org/learn/smart-cities

- **The Sustainable Development Goals – A global, transdisciplinary vision for the future** hosted by The University of Copenhagen
    - Duration: 10 hours, flexible deadlines
    - Cost: free to audit, or €47.00 to purchase the course and certification
    - Topics:
        - Sustainable development as a global goal
        - Managing human impacts on the natural world
        - Social sustainability and the way forward
    - Link: https://www.coursera.org/learn/global-sustainable-development

2.5.3 Udemy

- **Trees in Urban Environments** hosted by James McGregor
    - Duration: 9 lectures, 58 minutes total length
    - Cost: €20.00
    - Topics:
        - Urban heat island effect
        - Passive design solutions
        - C02 sequestration, air quality, stormwater management, and other benefits
        - Case studies
    - Link: https://www.udemy.com/course/trees-in-urban-environments

- **Water Resources and Environmental Engineering** hosted by Ahmed Ibrahim
    - Daration: 16 lectures, 10 hours total length
    - Cost: €39.99
    - Topics:
        - Water pollution, water requirement, water supply
        - Pumps and pumping machinery
        - Water treatment process, arsenic crisis
        - Water demand management and loss control
        - Water physical integrity

        - Sustainable development and environmental concepts, sustainable water management
    - Link: https://www.udemy.com/course/water-resources-and-environmental-engineering
- **Introduction to the Circular Economy** hosted by Sahar Mansoor
    - Duration: 75 lectures, 7 and a half hours total length
    - Cost: €23.00
    - Topics:
        - Regenerative agriculture and sustainable farming
        - Circular cities
        - Entrepreneurship and intrapreneurship
    - Topics: https://www.udemy.com/course/the-circular-economy

- **Climate Change and Sustainability** hosted by Dr Yishay Mor
    - Duration: 11 lectures, 1 hour 15 minutes total
    - Cost: €20.00
    - Topics:
        - Introduction course to climate change and sustainability
    - Link: https://www.udemy.com/course/climate-change-a-short-introduction

2.6 Conclusion Remarks and Tips for UCCRN_edu

The courses mentioned above are primarily free and high-quality in structure and design. Many of them overlap with UCCRN_edu topics and the primary purpose of addressing climate resilience and mitigation. Therefore, we should consider analysing further the courses that overlap (paying for accessing them), studying how to design a complementary MOOC, contacting the institutions that created those courses, asking them to become partners, and possibly including the courses on the UCCRN_edu web page. The courses that only partially overlap could provide a guide on what deserves to be developed and how to do it for the UCCRN_edu MOOC and educational offer.

3.

Design of the UCCRN_edu E-learning Platform

3.1 Target Audience

The choice of platform and the user experience are heavily influenced by the target user. For instance, if the MOOC user is from the public sector, widely accepted platforms like edX or Coursera would be more suitable. On the other hand, if the user is within the UCCRN network or a climate change professional, creating an independent webpage similar to the UN training page might be more beneficial. This approach would empower the developers to customise the structure to cater to a diverse audience.

What is the MOOC's intended outcome? Is it intended to teach skills with a specific software? Or is it intended to introduce the ARC.3 topics? Some options tend to optimise learning outcomes. For example, widely used platforms are designed to support essential learning functions. Teaching software specifics can best be done in a YouTube video that the students can access anytime.

3.2 Necessary Elements to Add to the MOOC

- Dates of availability: Will the course run all the time or only on specific dates?
- Discussion: How will the user engage with the professors? Will there be a discussion board?
- Course overview
- Syllabus
- Grading structure
- Content: How long will each course be? Each video should be between 8 and 10 minutes and naturally flow like a regular university course.

The provided screenshots and descriptions of the online modules that are currently online represent a starting point for the design structure. Please remember that the design is already provided for third-party platforms, and it is the responsibility of UCCRN to fulfil the requirements. However, if UCCRN chooses to create its own platform, clarifying and deciding on the elements mentioned above is essential.

3.3 UCCRN_edu E-learning Platform Design Principles

This part of the report reflects on critical elements to decide how to better design and offer online education for UCCRN_edu. In order to deliver quality online education, it is crucial to 1) understand the UCCRN_edu current capacities and funding to create which courses, 2) understand the partner's availability to share within our platform their courses, and 3) understand the current offer within the online education market.
Part 2 of this report explores these points, outlining the current capacities for creating content from the Erasmus+ UCCRN_edu and exploring resources from other partners wishing to share them within the UCCRN_edu Platform.

When considering the potential courses to be created and offered within the next few months of Erasmus+, we can design a user-centric course using the ARC3.3 Elements from the UCCRN_edu webpage. We can integrate all these topics into a single course or develop them as separate entities, always considering the software and skills our users will use during each module. This approach ensures the course's relevance and effectiveness and guides our decision on how to introduce it within the platform, with the user's needs being the primary consideration in determining the course's quality, length, and content.

The ARC3.3 Elements are:

- Urban climate change
- COVID-19, climate change, and cities
- Urban planning and design
- Governance, enabling policy environments, and just transitions
- Financing climate action
- Informality, equity, and development
- Interdependent infrastructure systems: energy, transport, buildings, water, and waste
- Nature-based solutions in urban areas: enhancing capacity to respond to shocks and stresses

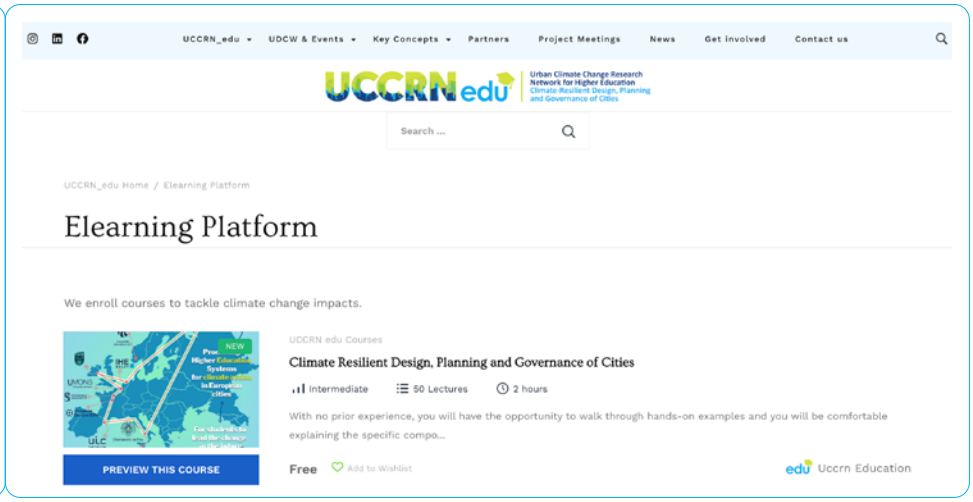
- Data and the role of technology
- Circular economies for cities
- Perception, communication, and behaviour
- Special report on case studies

3.4 UCCRN_edu E-learning Platform Front-end and Back-end

Figure 2. Screenshot from the front-end of the UCCRN_edu E-learning Platform's mock-up showing the MOOC home

Front-end

MOOC home



The above is the platform's home page, designed for user interaction (front-end). Each course section includes a cover image, title, brief description, duration, and additional general details.

Figure 3. Screenshot from the front-end of the UCCRN_edu E-learning Platform's mock-up showing the single course page

Front-end

Single course page

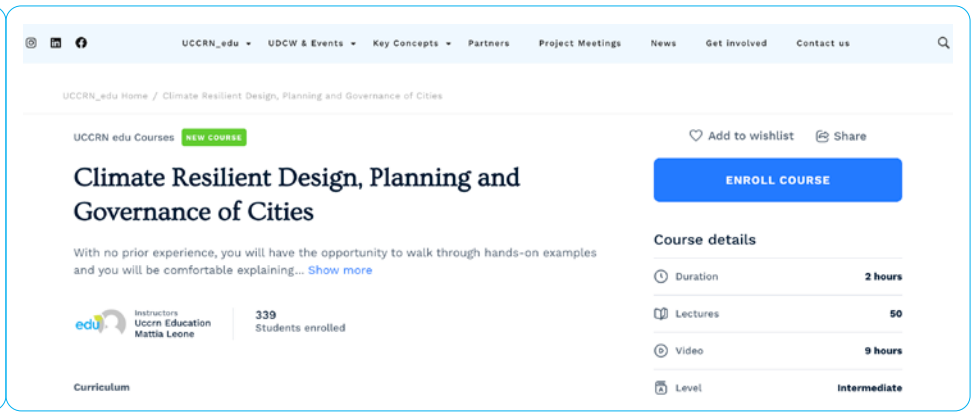


Figure 3. Screenshot from the front-end of the UCCRN_edu E-learning Platform's mock-up showing the single course page

Front-end

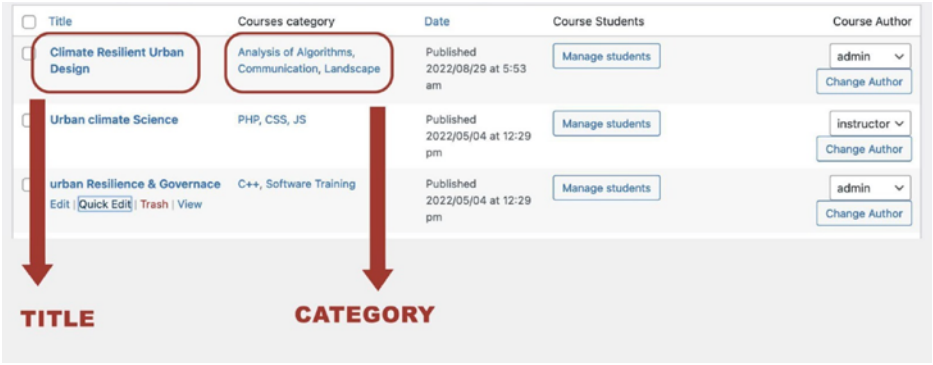
Single lesson page

Selecting a course from the home page redirects the user to a detailed course page. The lesson page provides navigation through various course content, such as videos, texts, and more.

Figure 5. Screenshot from the back-end of the UCCRN_edu E-learning Platform's mock-up showing how to manage a course

Back-end

Managing a course

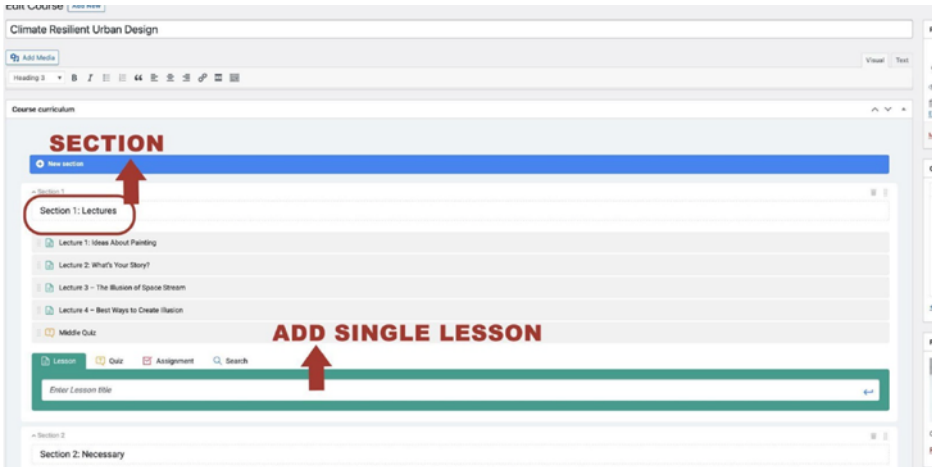


The back-end area is for professors/tutors to administer their courses, allowing them to do two tasks: manage or edit courses. The "Menage Course" area contains a complete list of all courses on the platform and the categories to which they belong. From this screen, you can access the editing part.

Figure 6. Screenshot from the back-end of the UCCRN_edu E-learning Platform's mock-up showing how to edit a course

Back-end

Editing a course

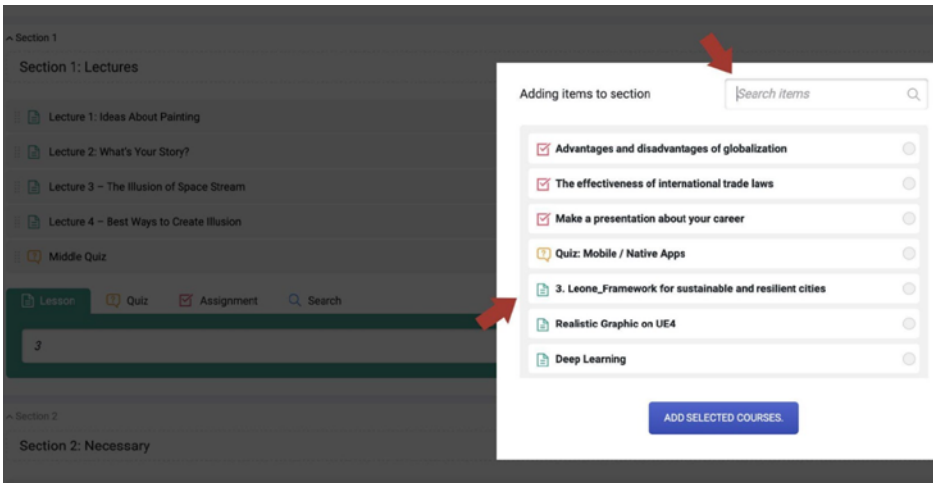


From the edit course screen, it is possible to edit the title, choose the category to which it belongs, divide the course into its respective sections, and upload all the materials needed to conduct the course: lectures, quizzes, assignments, etc.

Figure 4. Screenshot from the back-end of the UCCRN_edu E-learning Platform's mock-up showing how to add a lesson item to multiple course sections

Back-end

Adding a lesson item to multiple course sections by clicking on the tab "lesson"



Course materials can be uploaded via the drop-down menu that opens by pressing the add selected courses button. Each item can be assigned to several courses.

4.

The UCCRN_edu MOOC

4.1 Background

The Massive Open Online Course (MOOC), covering the UCCRN_edu and ARC3 topics, has been developed by Project Partners and Associated Partners and integrated into the UCCRN_edu collaborative platform (see Virtual Learning Environment) to be freely accessed by UCCRN_edu Courses students and the participants of the Intensive Study Programmes and Multiplier Events.

A MOOC is a practical tool for personal and professional growth. It's an online course open for anyone to enrol, offering a financially feasible and versatile means of acquiring new skills, advancing one's career, and expanding knowledge in a specialised field. This practicality empowers the students to take control of their learning journey and provides quality educational experiences on a large scale.

The UCCRN_edu MOOC is intended to be openly available and permanently accessible through UCCRN/UCCRN_edu channels and relevant international platforms (e.g., EPALE, UCCRN Regional Hubs websites, Edx.org) to increase its impact and dissemination.

Although closely connected to UCCRN_edu activities, the topics treated in the MOOC represent state-of-the-art knowledge concerning critical aspects of climate-resilient governance, planning, and design of cities, and thus highly transferable to other educational contexts.

Most of the Project Results for which students' contributions are highly relevant (UDCW reports, CSDS—Case Study Docking Station, Blog Posts) have been based on the concepts delivered by the UCCRN_edu MOOC to align them with the overall methodological framework and improve the comparative analysis of different case studies (e.g., UDCW reports, and CSDS) or cross-sectoral topics (e.g., Blog Posts).

4.2 Structure of the MOOC

The MOOC has been designed to tackle the need for an actual multidisciplinary educational path within UCCRN_edu while granting accessible lectures for non-specialist learners. In this sense, focusing on the urban environment and the implications of each specific topic in city design, planning, and governance will be used as a guiding principle for teaching staff to develop MOOC content.
The innovative feature is to involve a single MOOC world-leading scholars in the different thematic areas who already share a common vision on "Climate change and cities", thanks to their collaboration in working groups of UCCRN ARC3, IPCC, ICLEI, INGSA.
All the lectures are available at the folllowing link: https://www.uccrn.education/elearning/climate-resilient-design-planning-and-governance-of-cities

4.2.1 MODULE 1: UCCRN_edu

- **About UCCRN_edu**
  - Category: Interview
  - Contribution: UCCRN_edu
  - Lecturer: Mattia Leone
  - Partner's affiliation: University of Naples Federico II

- **Interdisciplinary Alliance for Climate Action**
  - Category: Interview
  - Contribution: UCCRN_edu
  - Lecturer: Chantal Pacteau
  - Partner's affiliation: Sorbonne Université

4.2.2 Climate Change and Urban Climate

- **Climate and Climate Change**
  - Category: Lecture
  - Contribution: External MOOC / Resource
  - Lecturer: Michael Mann
  - Partner's affiliation: SDG Academy

- **Carbon Emissions Scenarios**
  - Category: Interview
  - Contribution: UCCRN_edu
  - Lecturer: Michael Mann
  - Partner's affiliation: SDG Academy

- **Climates of Cities — Intro**
  - Category: Interview
  - Contribution: UCCRN_edu
  - Lecturer: Gerald Mills
  - Partner's affiliation: University College Dublin

- **Climates of Cities 1**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Gerald Mills
  - Partner's affiliation: University College Dublin

- **Climates of Cities 2**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Gerald Mills
  - Partner's affiliation: University College Dublin

- **The Urban Heat Island (UHI)**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Gerald Mills
  - Partner's affiliation: University College Dublin

4.2.3 Global Challenges and Urban Transformation

- **Welcome to the Anthropocene**
  - Category: Lecture
  - Contribution: External MOOC / Resource
  - Lecturer: Johan Rockström
  - Partner's affiliation: PIK - Potsdam Institute for Climate Impact Research

- **The Urban Opportunity 1**
  - Category: Lecture
  - Contribution: External MOOC / Resource
  - Lecturer: Aromar Revi
  - Partner's affiliation: SDG Academy

- **The Urban Opportunity 2**
  - Category: Lecture
  - Contribution: External MOOC / Resource
  - Lecturer: Aromar Revi

- Partner's affiliation: SDG Academy

- **Transition Theory for Sustainable Cities**
  - Category: Lecture
  - Contribution: External MOOC / Resource
  - Lecturer: Bas Van Vliet
  - Partner's affiliation: Wageningen University

- **Systemic Change**
  - Category: Lecture
  - Contribution: External MOOC / Resource
  - Lecturer: Dennis Pamlin, Aimée Aguilar Jaber, Gemma O'Reilly, Felix Creutzig, Pourya Salehi
  - Partner's affiliation: COP27

4.2.4 Urban Resilience

- **Defining Urban Resilience**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Lorenzo Chelleri
  - Partner's affiliation: Universitat Internacional de Catalunya

- **Resilience Approaches**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Lorenzo Chelleri
  - Partner's affiliation: Universitat Internacional de Catalunya

- **Resilience vs Sustainability**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Lorenzo Chelleri
  - Partner's affiliation: Universitat Internacional de Catalunya

- **Is It still Worth to Talk about Resilience and Cities?**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Lorenzo Chelleri
  - Partner's affiliation: Universitat Internacional de Catalunya

4.2.5 Resilience of Critical Infrastructure

- **Technical Systems and Urban Services**
  - Category: Interview
  - Contribution: UCCRN_edu
  - Lecturer: Margot Pellegrino
  - Partner's affiliation: Université Gustave Eiffel

- **Urban Resilience & Critical Infrastructures**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Margot Pellegrino
  - Partner's affiliation: Université Gustave Eiffel
  - Link: WIP

- **Energy Part 1 — Infrastructure Resilience: Definitions, Focus on Power Grid**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Margot Pellegrino
  - Partner's affiliation: Université Gustave Eiffel

- **Energy Part 2 — Infrastructure Resilience: Power Grid Resilience through Alternative Systems**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Margot Pellegrino
  - Partner's affiliation: Université Gustave Eiffel

- **Resilience and Urban Risk Management : Flooding Case Study**
  - Category: Topic introduction
  - Contribution: UCCRN_edu
  - Lecturer: Bruno Barroca
  - Partner's affiliation: Université Gustave Eiffel

4.2.6 Urban Ecology

- **Water on Earth**
  - Category: Interview
  - Contribution: UCCRN_edu
  - Lecturer: Christian Valentin
  - Partner's affiliation: Sorbonne Université

- **Air, Water, Food and Natural Resources**
  - Category: Lecture
  - Contribution: External MOOC / Resource
  - Lecturer: Aromar Revi
  - Partner's affiliation: SDG Academy

- **Major Soil and Water Issues in Coastal Cities**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Christian Valentin
  - Partner's affiliation: Sorbonne Université

- **Introduction to Fire Ecology**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Jacques Gignoux
  - Partner's affiliation: Sorbonne Université

4.2.7 Equity and Environmental Justice

- **Spatial Justice: Right to the City**
  - Category: Lecture
  - Contribution: External MOOC / ResourceUCCRN_edu
  - Lecturer: Caroline Newton
  - Partner's affiliation: BlendEd

- **Spatial Justice: Cornerstone of Urban Sustainability**
  - Category: Lecture
  - Contribution: External MOOC / ResourceUCCRN_edu
  - Lecturer: Roberto Rocco
  - Partner's affiliation: Technische Universiteit Delft

- **Inclusive Climate Action Approaches to Accelerating a Just Transition**
  - Category: Lecture
  - Contribution: External MOOC / ResourceUCCRN_edu
  - Lecturer: Mehrnaz Ghojeh, Wayne Shand, Ruben Werchan
  - Partner's affiliation: ICLEI Local Governments for Sustainability

- **"We Live Here Together" How to Jointly Tackle Climate Change and Inequality**
  - Category: Lecture
  - Contribution: External MOOC / Resource UCCRN_edu
  - Lecturer: C40 Cities
  - Partner's affiliation: C40 Cities

4.2.8 Climate Resilient Planning and Urban Design

- **UCCRN_edu Framework for Sustainable and Resilient Cities**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Mattia Leone
  - Partner's affiliation: University of Naples Federico II

- **Climate Resilient Planning and Urban Design**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Jeffrey Raven
  - Partner's affiliation: New York Institute of Technology

- **Green and Blue Infrastructures (Planning/Design Focus)**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Mattia Leone
  - Partner's affiliation: University of Naples Federico II

- **Building Envelope and Surface Materials**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Mattia Leone
  - Partner's affiliation: University of Naples Federico II

- **Napoli-Durban UDCW Case Studies**
  - Category: Case Study
  - Contribution: UCCRN_edu
  - Lecturer: Mattia Leone
  - Partner's affiliation: University of Naples Federico II

- **Spatialise Energy: Projects for Energy Transition in Cities**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: Vincent Becue

- Partner's affiliation: University of Mons

- **Water Sensitive Cities**
  - Category: Lecture
  - Contribution: UCCRN_edu
  - Lecturer: William Veerbeek
  - Partner's affiliation: IHE Delft Institute for Water Education

4.2.9 Tools for Climate Resilient Planning and Urban Design

- **GIS Design Tools for Urban-scale Climate Analysis**
  - Category: Lecture (GIS design tools)
  - Contribution: UCCRN_edu
  - Lecturer: Nicola Addabbo
  - Partner's affiliation: University of Naples Federico II

- **Introduction to Simulation Tools — Focus on: 3D Modelling Tools for Neighbourhood Scale Climate and Energy Analysis**
  - Category: Lecture (Parametric Design Tools)
  - Contribution: UCCRN_edu
  - Lecturer: Giovanni Nocerino
  - Partner's affiliation: University of Naples Federico II

- **Rhino Modelling for Energy and Environmental Simulations**
  - Category: Lecture (Parametric Design Tools)
  - Contribution: UCCRN_edu
  - Lecturer: Giovanni Nocerino
  - Partner's affiliation: University of Naples Federico II

- **Urban Adaptation Tool**
  - Category: Tutorial (Online Tool)
  - Contribution: UCCRN_edu
  - Lecturer: Margot Pellegrino
  - Partner's affiliation: Université Gustave Eiffel

- **Heat Waves Simulation (SOLWEIG)**
  - Category: Tutorial
  - Contribution: UCCRN_edu
  - Lecturer: Nicola Addabbo
  - Partner's affiliation: University of Naples Federico II

- **Heat Waves Simulation (PLINIVS HWlem)**
  - Category: Tutorial
  - Contribution: UCCRN_edu
  - Lecturer: Nicola Addabbo
  - Partner's affiliation: University of Naples Federico II

- **Freedom and Flexibility to Model Real World Complexity**
  - Category: Lecture (Parametric Design Tools)
  - Contribution: External MOOC / Resource
  - Lecturer: Mostapha Sadeighpour Roudsari, Chris Mackey
  - Partner's affiliation: CORE studio at Thornton Tomasetti

- **Ladybug Tools Tutorials**

- Category: Tutorial (Parametric Design Tools)
- Contribution: External MOOC / Resource
- Lecturer: Various
- Partner's affiliation: Ladybug Tools

- **Beginner Guide to QGIS**
  - Category: Tutorial (GIS Tools)
  - Contribution: External MOOC / Resource
  - Lecturer: GeoDelta Labs
  - Partner's affiliation: GeoDelta Labs

- **QGIS Trainings Tutorial YouTube Channel**
  - Category: Tutorial (GIS Tools)
  - Contribution: External MOOC / Resource
  - Lecturer: Statistics Canada
  - Partner's affiliation: Statistics Canada

- **Data Collection (NDVI Calculation)**
  - Category: Tutorial (GIS Tools)
  - Contribution: External MOOC / Resource
  - Lecturer: GeoDelta Labs
  - Partner's affiliation: GeoDelta Labs

- **Stream and Catchment Delineation with GIS (Theory)**
  - Category: Tutorial (GIS Tools)
  - Contribution: External MOOC / Resource
  - Lecturer: Hans van der Kwast
  - Partner's affiliation: IHE Delft Institute for Water Education

Urban Climate Change Research Network for Higher Education

Climate-Resilient Design, Planning and Governance of Cities

www.uccrn.education