VIU SUMMER SCHOOL
CRITICAL INFRASTRUCTURE RESILIENCE

Critical Infrastructure Resilience
June 26 - 30, 2017
Venice International University
Isola di San Servolo, Venice

Venice International University

Università di Roma Tor Vergata

WASEDA University

LUND UNIVERSITY

VIU Summer School

Critical Infrastructure Resilience

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Scientific Coordinator:

Erdem Ergin,
University of Tor Vergata

In its first edition, the summer school on Critical Infrastructure Resilience (CIR) brings together academics and professional experts to discuss an emerging topic with a pragmatic and scientific approach.
Efforts on critical infrastructure resilience are recent and drawing increasing attention and resources. Some countries initiated their efforts against terrorism (i.e. US, Australia), while others were primarily focused on natural events (i.e. UK, Turkey). Today, almost all countries adopt a multi-hazard approach encompassing a wide variety of events. The topic is also high in the agenda in Europe, with a Council Directive approved in 2008 and became a priority topic of the Slovakia Presidency of the European Commission (July-December 2016). Because it is a key aspect to understand globalization and how this inter-connected, complex system works, it is of high relevance to participants working at different scales and doing interdisciplinary work. This course will provide them tools to analyze a system and its components, prioritize connectivity, assess risk, and develop resilience strategies. These techniques can be applied to various fields and at various scales, from city scale to a global supply chain.

The course consists of a mix of theoretical knowledge, case studies/projects and hands-on exercises. The beautiful city of Venice will be used as a laboratory and students will learn first hand how to identify a critical infrastructure, assess its risk, develop resilience strategies and devise ways to apply them.

Who is it for?
Graduate students and working professionals from any university, research institute, or other organization (private companies, government agencies, NGOs) with an interest in critical infrastructure issues and ability to read and write fluently in English. Advanced undergraduates will also be considered.

Faculty
Erdem Ergin, University of Tor Vergata/ World Bank
Tomoya Shibayama, Waseda University
Henrik Hassel, Lund University
Jonas Johansson, Lund University
Gaetano Vivo, European Commission

Topics

Critical infrastructure
We live in an increasingly connected world, where commercial trade, production supply chains, labor and services are becoming more spatially dispersed. This makes the global system increasingly interdependent and complex and the loss of performance or disruption in some key points can have a cascading impact throughout the system. We refer to these key points as critical infrastructure: "An asset, system or part thereof which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact". This course explains how critical infrastructure works and fails; its cascading impact from local to global, and the strategies to use to build resilience against e.g. extreme events and climate change.

Cascading Impact
The 2011 Tohoku Earthquake that hit Japan is one of such example. The disruption in many automotive factories had rippling effects, like the General Motors truck plant in Louisiana that had to shut down temporarily for lack of Japanese-made parts. Similar scenarios unfolded after the 2012 Thailand Floods and 2015 India Floods, which hit heavily industrial zones and caused cascading impacts along the supply chain. Such cases are not limited with production: the 2010 volcanic eruption over Iceland grounded commercial flights over 20 countries, affecting 10 million passengers. A mechanical failure at a key power transmission nod in Turkey in 2012 caused turbulence across the European grid and a breakdown of the Gibraltar connection, thousands of kilometers away. These examples illustrate how the concept of critical infrastructure can be applied at many scales and across all fields.

Resilience
Critical infrastructure resilience has its roots in system theory and complexity theory, with applications ranging from engineering performance design to ecosystem management. We use the broader definition " the capacity of a system to absorb disturbance and re-organize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks." This definition means that we consider 2 types of impact: an extreme event (i.e. terrorist attack or a natural disaster) that can affect the physical integrity of an infrastructure and/or disrupt its core function or, a change in operating conditions (such as different mean temperature or precipitation pattern due to climate change) that can affect the performance and competitiveness of the infrastructure.

Risk Management
As defined by the UNISDR, risk management comprises risk assessment and analysis, and the implementation of strategies and specific actions to control, reduce and transfer risks. It is widely practiced by organizations to minimize risk in investment decisions and to address operational risks such as those of business disruption, production failure, environmental damage, social impacts and damage from fire and natural hazards. Risk management is a core issue for sectors such as water supply, energy and agriculture whose production is directly affected by extremes of weather and climate.

Course outline
The 5-day course consists of 10 modules:

M1 – Definition & role of critical infrastructure
M2 – Cascading impacts & ranking criticality
M3 – Risk assessment & developing scenarios
M4 – Applied work: identification of critical infrastructure in Venice
M5 – Infrastructure systems and asset management
M6 – Applied work: risk assessment and prioritization
M7 – Risk management strategies
M8 – Applied work: develop resilience strategies
M9 – Strategic thinking within the EU
M10 – Connecting the dots with the infrastructure life cycle

Application procedure and cost
The Program will admit 25 student participants.

fees:
Students of VIU member universities:
€ 300 incl. VAT.
Students of other universities/professionals:
€ 600 incl. VAT

The fees will cover tuition, course materials, accommodation in multiple rooms at the VIU

campus, lunches in the VIU cafeteria and social events.
Student participants will be responsible for covering their own travel expenses to and from Venice and local transportation.

On-line application
Available from February 13, 2017 on the VIU website.
Applicants must submit the application form, a letter of motivation – which should include a brief description of the candidate's research interests, a curriculum vitae and a photo.

Application deadline: March 10, 2017
Admitted candidates will be notified by March 17, 2017.

Credits
Number of ECTS credits allocated: 2.
A certificate of attendance will be issued at the end of the course.

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Venice International University
Isola di San Servolo
30133 Venice, Italy
T +39 041 2719511
F +39 041 2719510
E summerschools@univiu.org
www.univiu.org

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