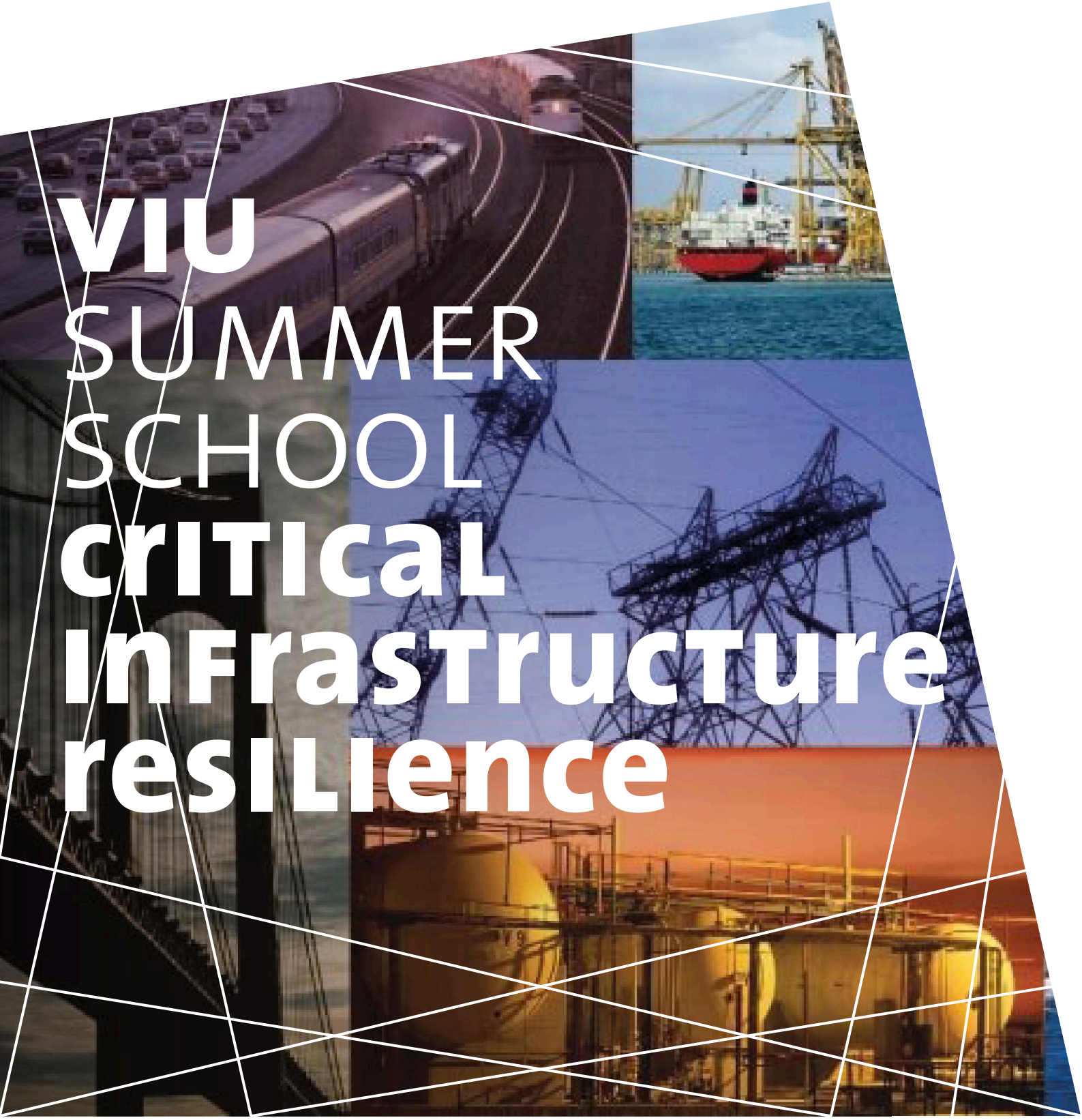

VIU SUMMER SCHOOL CRITICAL INFRASTRUCTURE RESILIENCE

Critical Infrastructure Resilience
July 16-20, 2018
Venice International University
Isola di San Servolo, Venice

Venice International University

VIU Summer School

Critical Infrastructure Resilience

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Scientific Coordinator:

Erdem Ergin, University of Rome Tor Vergata

In its second 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.

Our societies are facing increasing challenges from a variety of sources, ranging from terrorism and cyber threat to natural disasters and climate change. It is foremost the ecosystem services and the socio-economic systems that constitute our daily lives that are at risk. And we see that efforts to build resilience into these systems, and the society overall, have stepped up: whether at national level, at city scale or within a specific sector, we see more resources and attention for the elaboration of resilience plans and implementation of measures, most of them adopting a multi-hazard approach.

The notion of critical infrastructure (CI) come very handy to support efforts for a resilient society. The EU and some countries have developed specific legislation (i.e. the EU Council Directive approved in 2008 or the UK Critical Infrastructure Protection in 2010) to tackle the subject directly. However the concept of CI is a pragmatic tool in itself and can be applied in many fields, at different scales. It reflects the inter-connected and complex society we live in and allows us to (i) see the dependencies, (ii) deal with the uncertainties, and (iii) understand the impacts and effects within and beyond a specific scale or field of work. This course will discuss the concept of CI and the EU framework, and present a series of tools and solutions for resilience. The participants will gain (i) a clear understanding of the key concepts, (ii) a methodology to apply it to their specific field/scale, and (iii) an overview of specific tools and solutions from recent applications.

The course consists of a mix of theoretical knowledge, case studies/projects and hands-on exercises. The beautiful city of Venice is an ideal place that participants can use to identify a critical infrastructure, assess its risk and develop resilience strategies.

Who is it for?
The first edition drew mainly professionals from the risk management sector and PhD students. This edition targets a similar audience: 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 Rome Tor Vergata
Mitsuyoshi Akiyama, Waseda University
Marcus Abrahamsson, Lund University
Jonas Johansson, Lund University
Gaetano Vivo, European Commission
Carlo Giupponi, Università Ca' Foscari Venezia
Silvio Nocera, IUAV University
Federico Carturan, RiskApp

Topics

Critical infrastructure

We live in an increasingly connected world, where resources, people, knowledge and services are becoming more spatially dispersed. This makes our society and our daily lives increasingly interdependent and complex. Although this allows us to be more productive and efficient, when there is a failure or a problem in some key locations, the impact is also shared throughout the system. We refer to these key locations 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". The course explains the concept of critical infrastructure, how to identify them, and how they work and fail.

Domino and Cascading Impact

The 2011 Tohoku Earthquake that hit Japan is one such example. The disruption in many automotive factories had rippling effects, like a truck plant in Louisiana that had to shut down temporarily for lack of Japanese-made parts. On a more daily basis, imagine the breakdown of your computer at work and its impact on your day, maybe the day of your colleagues. By domino impact we refer to "a chain reaction where one event sets off a chain of similar events within the same system" and by cascading impact we refer to "a chain reaction where one event has an effect beyond its boundaries, within other systems". As an example, the closure of a bridge will have both domino impact (delays in the transport network) and cascading impact (delays in supply chains using the transport network).

Resilience

Critical infrastructure resilience has its roots in system theory and complexity theory. 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: (i) an extreme event that can affect the physical integrity of a CI and/or disrupt its core function and (ii) a change in operating conditions that can affect the performance of the CI. To give one example for each: A mechanical failure at a key power transmission node in Turkey in 2012 caused turbulence across the European grid and a breakdown of the Gibraltar connection, thousands of kilometers away. The 2010 volcanic eruption over Iceland grounded commercial flights over 20 countries, affecting 10 million passengers. But there was no physical damage to any asset. These examples illustrate how the concept of critical infrastructure can be applied at many scales and across all fields.

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 – The EU framework
M3 – Cascading impacts & ranking criticality
M4 – Risk assessment & developing scenarios
M5 – CI Resilience solutions from infrastructure, business and agriculture

M6 – Applied work: identify and assess CI
M7 – Life-cycle-based design and assessment of civil systems under multiple hazards
M8 – Critical Impacts of Climate Change on Transport Infrastructure Planning
M9 – Decision-making under uncertainty
M10 – RiskApp, presentation and logic of a cascading impact estimation software

Application procedure and cost
The Program will admit up to 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 27, 2018 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 29, 2018
Admitted candidates will be notified by April 5, 2018.
Admitted candidates should pay the fee by April 12.

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

Location

viu summer SCHOOL

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