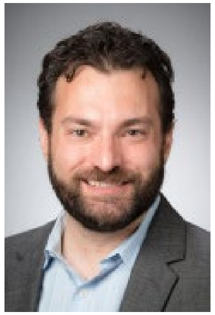
Course	Lecturer	Resume	About the course
Seismic Resilience of Bridges and Highway Systems	**Ian Buckle**  Foundation Professor, Department of Civil & Environmental Engineering, University of Nevada, Reno, USA.	Dr. Buckle is a Foundation Professor in the Department of Civil and Environmental Engineering at the University of Nevada Reno. He is a former director of the UNR Structural Engineering Laboratories and earned his bachelor and doctoral degrees at the University of Auckland, New Zealand. Dr. Buckle's research interests include improving the seismic performance of highway bridges, design and retrofit criteria for bridges, earthquake protective systems, tsunami loads, and soil-structure-interaction for bridges with deep foundations. In addition to teaching graduate courses in these topics, he participates in short courses for design professionals in the seismic design of new bridges, retrofitting of existing bridges and the seismic isolation of new and existing bridges.	Highway and railroad systems are essential to a nation's prosperity and play a vital role in the resilience of a region after a major earthquake (or any other disaster). Bridges are critical components of these systems. This set of lectures will first define bridge resilience and then review the performance of bridges in past earthquakes including how seismic loads are characterized for bridges. Next the principles of bridge design will be covered and methods of analysis introduced for the calculation of seismic design forces and displacements. The principle of capacity-protected design will be explained in which controlled damage is accepted in selected components (e.g. columns) to avoid span collapse during the design earthquake. Performance-based seismic design of bridges will follow in which bridge resilience may be framed. Potential extension to the quantification of resilience of entire highway systems will conclude the lecture.

Course	Lecturer	Resume	About the course
Seismic Vulnerability and Resilience of Underground Structures	**Antonio Bobet**  Professor, Lyles School of Civil Engineering, Purdue University, West Lafayette, IN, USA.	Dr. Bobet is the Edgar B. and Hedwig M. Olson Professor in Civil Engineering at Purdue University and former Guest Professor and Visiting Chair Professor of the Innovation Center for Disaster Prevention of the School of Civil Engineering, Tongji University, China. He holds a bachelor's and master's degrees in Civil Engineering from Technical University of Madrid in Spain and a Doctor of Science degree from Massachusetts Institute of Technology. He has extensive experience in practice. He was senior geotechnical engineer at Euroestudios, consulting engineers, in Spain, for four years, and construction manager at Ferrovial, Spain, also for four years. Dr. Bobet's areas of interest include rock fracture mechanics, wave propagation through fractured media and underground structures. He has authored or co-authored more than two hundred technical publications. He serves or has served on the Editorial Board of a number of Journals. He is the Co-Editor in Chief of Underground Space. He was elected member of the Board of Directors of the American Rock Mechanics Association in 2009, and served as its President from 2013 to 2015. He was the Chair of the 2012 U.S. Rock Mechanics/Geomechanics Symposium and is a member of the Geotechnical Advisory Board (GAB) of the Panama Canal. He was appointed a High-end Foreign Expert by the Government of China in 2016.Dr. Bobet has received a number of awards, including the ASCE 2011 Ralph B. Peck Award, the 2012 National Award for Significant Contributions in Science and Technology – SENACYT Panama, the 2012 ARMA Research Award, and the 2022 George F. Sowers distinguished lecture. In 2016, he was elected Fellow of the American Rock Mechanics Association.	This course covers methods for the seismic design and performance of underground structures. We will first discuss the damage observed in tunnels during earthquakes and then explore in detail the failures of two tunnels during major earthquakes. The lessons learned from the failures will be used to develop a fundamental understanding of the displacement and stress-transfer mechanisms between the ground and the tunnel support during a seismic event. We will then review the free-field and the soil-structure interaction methods and learn the conditions under which a quasi-static analysis is sufficient for design, instead of the far more expensive dynamic analysis. We will also examine the differences between drained and undrained analyses and the effects of excess pore water pressures and their accumulation on the tunnel performance. Finally, we will develop and discuss analytical solutions for deep tunnels subjected to P- and S-waves, propagating along a direction perpendicular or parallel to the axis of the tunnel.

Course	Lecturer	Resume	About the course
Seismic Resilience of Building Structures	**Richard Henry**  Associate Professor, Department of Civil and Environmental Engineering, The University of Auckland, Auckland, New Zealand.	Richard Henry is an Associate Professor and Deputy Head in the Department of Civil and Environmental Engineering at the University of Auckland. His research interests focus on the seismic design and assessment of reinforced concrete structures. Specifically, design and repairability of reinforced concrete walls, assessment and retrofit of precast concrete floors, and the design of seismic resilient or low-damage structures. Prof. Henry is the current Vice President of the Concrete NZ – Learned Society. He has served as a member of the technical committee for the New Zealand Concrete Structures Standard (NZS 3101:2006) and is a current member of US Building Code Requirements for Structural Concrete seismic sub-committee (ACI 318-H).	Resilient structures that can not only survive large earthquakes but also allow for rapid recovery of their occupancy and functionality are critical to improving societal outcomes. In addition to satisfying the basic life-safety design objectives, structures are increasingly being designed to higher performance objectives that specifically target reduced damage, repairability, and rapid reoccupancy and functionality. Innovative technologies and novel materials continue to be developed to design resilient seismic resisting structural systems. Resilient or low-damage precast concrete systems that utilize jointed designs have been developed and researched for several decades. Examples include post-tensioned wall and frame systems that evolved from the PRESSS research programme, precast wall panels with debonded reinforcement, and slotted beams that eliminate axial elongation and associated floor damage. Many of these precast concrete systems have been implemented into building, where lessons were learnt regarding practical design and detailing methods. Beyond the component design, the performance of the entire structure including the interactions between structural systems must be considered to meet the required performance outcomes.

Course	Lecturer	Resume	About the course
Seismic Resilience of Building Structures	**Dimitrios Konstantinidis**  Associate Professor, Department of Civil and Environmental Engineering, University of California, Berkeley, California, USA.	Dimitrios Konstantinidis is an Associate Professor in the Department of Civil and Environmental Engineering at UC Berkeley. His research interests are in the areas of earthquake engineering and engineering mechanics. His work focuses on better understanding, quantifying, and improving the earthquake performance of nonstructural building components, seismic isolation and other structural control systems, and enhancing the safety and resilience of critical facilities such as hospitals and power plants in the face of natural hazards. His research combines experimental testing and mathematical modeling for a range of purposes: gaining a deep understanding and accurate characterization of behavior; proposing innovative earthquake protection solutions; and providing recommendations for improved design codes and guidelines.	The course covers the analysis and design of seismically isolated structures. We will begin by introducing the theory of seismic isolation using fundamentals of structural dynamics. After presenting the different types of commonly used seismic isolation devices, we will delve into their mechanical behavior and modeling under shear, compression, and bending, as well as their stability. Finally, we will cover basic design requirements and methods of response analysis of seismically isolated structures.

Course	Lecturer	Resume	About the course
Seismic Resilience of City System	**Gian Paolo Cimellaro**  Professor, Department of Civil, Structural and Building Engineering, Polytechnic of Turin, Torino, Italy.	Prof. Gian Paolo Cimellaro primary field of investigation is Earthquake Engineering with emphasis on defining Quantification of Resilience of systems. Prof. Cimellaro's interdisciplinary research investigates representations of health system properties and processes, creating quantitative modeling solutions for a better understanding of sustainable use and resilience of systems that often challenges collaborating teams consisting of scientists, social scientists, engineers, lawyers and extension specialists across a wide spectrum of disciplines. His major contribution has been the quantification of the concept of disaster resilience in which a unified terminology and a common resilience framework is proposed that can be used for analyzing critical facilities (e.g. hospitals, military buildings, etc.), and utility lifelines (e.g. electric power systems, transportation networks, water systems etc.). His interdisciplinary recent research has focused on quantifying the social and economic impact of critical infrastructure disruption during disasters.	The seminar gives an overview of the main research activities developed by the Disaster Resilience research group of the Politecnico di Torino. Quantifying resilience is one of the most challenging tasks due to the complexity involved in this multidisciplinary process. In the seminar, a "community resilience" framework is proposed and few applications at different spatial scales are considered. Interdependencies triggered by the debris between the built environment and the transportation network is also analyzed and applied to a virtual city to test different resilience strategies to limit losses and downtime. Building Information Modelling (BIM) is a methodology that is radically changing the construction sector and in this seminar, it has been combined with ML and SHM for seismic vulnerability assessment of structures. Following the collapse of the Morandi Bridge in Italy in August 2018 and Champaign Tower in 2021 an applied element model of the bridge has been realized and some considerations about the collapse of both type of structures have been provided. Finally, the use of new information technologies to improve resilience and disaster management is also investigated showing a new sensor system to be used during emergencies to track victims indoor.

Course	Lecturer	Resume	About the course
Seismic Resilience of Lifeline Engineering	TBD	TBD	TBD