University of Pavia

IUSS School of Advanced Studies

Civil Engineering for Mitigation of Risk from Natural Hazards

Course: Bridge Structures
a.y.: 2018/2019
Lecturer: G.M. Calvi
Date: 26/11/2018 – 21/12/2018
Classroom: Sala del Camino, 1-16 @ IUSS

Course schedule

Week	Date	Lecture hours From____ To____	Tutorial hours From____ To_____	Subject	Tot h
1 S.C.	26/11/2018	09.00 – 12.00		Introduction: evolution of design and construction practise	
	27/11/2018	09.00 – 12.00		Bridge types: simply supported and continuous beam, truss, arch, stayed and suspension bridges	
	28/11/2018	09.00 – 12.00	15:00 – 17.00	**L:** Loads on bridges: gravity, traffic, wind, earthquakes, collisions, currents, temperature **T:** Examples of solutions of bridge design	
	29/11/2018		15:00 – 17.00	Presentation and discussion of HA 1	
2 S.C.	03/12/2018	09.00 – 12.00		Deck considerations: solution of indeterminate beams, influence lines and surfaces	
	04/12/2018	09.00 – 12.00		Deck considerations: pre-stressed beams, concrete box, steel-concrete composite	
	05/12/2018	09.00 – 12.00	15:00 – 17.00	**L:** Design of piers, foundations, bearings and joints **T:** Application of influence and surface lines	
	06/12/2018		15:00 – 17.00	Design of a bridge deck: flexure, shear, torsion, pre- and post-tensioning, steel-to-concrete connection. Collection of HA 1, presentation of HA 2	
3 1- 16	10/12/2018	09.00 – 12.00		Construction methods	
	11/12/2018	09.00 – 12.00	15:00 – 17.00	**L:** Maintenance and degradation, assessment and strengthening **T:** Design of foundation and pier systems	
	12/12/2018		15:00 – 17.00	Design of bearings and expansion joints. Collection of HA 2, presentation of HA 3	
4 1- 16	17/12/2018		15:00 – 17.00	Examples of construction methods	
	18/12/2018		15:00 – 17.00	Case studies on degradation, assessment and strengthening	

	19/12/2018	09.00 – 12.00	15:00 – 17.00	**L:** Seismic design of bridges **T:** Case studies on seismic design, assessment and strengthening	
	20/12/2018	09.00 – 12.00	15:00 – 17.00	**L:** Roads systems, damage scenarios, prioritization schemes **T:** Summary of the course, Q&A, collection of HA 3	
	21/12/2018	09.00 – 12.00		Final Exam (Sala del Camino)	3

Homework assignments (HA)

- November 29th due December 6th
  Conceptual design of a bridge: definition of constraints, choice of a structural type, load analysis, preliminary dimensioning of elements
- December 6th due December 12th
  Detailed design of components: deck analysis (flexure, shear and torsion)
- December 12th due December 20th
  Detailed design of components: pier, foundations, bearing, joints