

Time	Description	Lecturer	
Morning	Course start and introduction of the day's events		
	General analysis process for concrete dam modelling	Dr. Jerzy Salamon, USBR, USA	
	General introduction to the FEM and its application in the analysis and design of concrete dams	Dr. Tobias Gasch, COMSOL Multiphysics, Sweden	
	<ul style="list-style-type: none"> <li>Mechanical and physical phenomena</li> <li>Linear and non-linear physical and mechanical material behaviour</li> </ul>	<ul style="list-style-type: none"> <li>Linear and non-linear FEM analysis</li> <li>Coupled and transient FEM analysis</li> <li>Dynamic FEM analysis</li> </ul>	
	Break		
	Material properties for different application of FE for analysis and design of dams	Dr. Manouchehr Hassanzadeh, Sweco, Sweden	
	<ul style="list-style-type: none"> <li>Guidelines and codes – examples of Eurocode, Model Code and the general parts of the Swedish Standards.</li> <li>Experimental methods</li> </ul>	<ul style="list-style-type: none"> <li>Determination of material parameters through analysis of dam behavior measurements and retro or back-analysis.</li> </ul>	
	Lunch break		
Afternoon	Application aspects of numerical modelling	Dr. Morteza Sohrabi Gilani, Sweco, Sweden	
	<ul style="list-style-type: none"> <li>Geometrical model</li> <li>Element discretization</li> <li>Material behaviour</li> </ul>	<ul style="list-style-type: none"> <li>Boundary conditions and constraints</li> <li>Mechanical and physical loads in static, transient and dynamic conditions</li> <li>Solver solution techniques</li> </ul>	
	Break (20 min)		
	Verification and validation process in the analyses of concrete dams	Dr. Jerzy Salamon, USBR, USA	
	Practical modelling exercise with DIANA FEA	Dr. Denise Ferreira , DIANA FEA, Netherlands	
	Summary		
	The end of the Course		