Flood Risk Management						**WSE/HI10 HIFRM**
10 - 29 June 2013						**5 ECTS Credit Points**
Mentor:	B. Bhattacharya					
Tuition form & study load:	*Topic*	*Contact hours*			*Study load [hrs]*	*Examination/weight*
		Lecture	*Exercise*	*Workshop.*		
	Flood risk management	20	8	6	82	
	Flood modelling: methods and techniques (advanced features)		28	2	58	Exercise reports (40%)
	(total contact hours 64)				Total 140	Written exam on all subjects (60%)
Pre-requisites:	Hydraulics, hydrology, river basin and flood modelling, statistics					
Learning objectives:	On completion of this module the participants are able to: 1. Understand and explain the main principles of flood risk management; 2. Understand the Hydroinformatics tools available for flood risk management; 3. Conceptualise the main principles of EU flood directive and have knowledge about European experience in flood risk management; 4. Understand and explain the main principles of flood forecasting and warning and uncertainty issues associated with flood forecasts; 5. Familiarise with the different flood forecasting models; 6. Utilise their hands-on experience in the step-by-step modelling procedure to build flood inundation models.					
Content:	**Flood risk management, B. Bhattacharya (IHE), P. Samuels (HR Wallingford), F. Klijn (Deltares), M. Werner (IHE)** Introduction to flood risk management. Quantifying flood risk – probabilistic and statistical approaches. Risk-based decision making. Case studies. Introduction to risk analysis of flood defence structures. Case studies. Flood vulnerability and resilience. European experience in managing floods. EU framework directive on floods. Other national (eg UK) flood directives. Flood disaster management (Pre-, post- and during flood). Flood emergency response and flood preparedness. Flood fighting, recovery and insurance. Evacuation management. Flood forecasting and warning. Objectives. Lead time considerations. Data requirements. Flood forecasting models. Issuance of flood warning and response. Uncertainty issues in flood forecasting. Modelling uncertainty and its benefits. Social issues. Where possible lectures and exercises will be given in conjunction with Module 10 of the Hydraulic Engineering and River Basin Development Specialisation.					
	Advanced river flood modelling, I. Popescu (IHE), B. Bhattacharya (IHE), G. Di Baldassarre (IHE) and S. J. van Andel (IHE) 2D, 1D2D river flood modelling. Dam break modelling. Flood modelling, in 2D, in support of flood mitigation strategies (including flood risk maps. Structural and non-structural approaches in flood mitigation. Engineering solutions - flood routing and flood alleviation: channel & reservoir routing, flood banks, channel improvements, diversion schemes, flood storage on-stream and off-stream ; and non-structural issues - approaches to the reduction of flood impacts, flood risk maps.					
Course materials:	*Lecture notes on Hydroinformatics for flood management, EU framework directive, flood risk management* *Lecture notes on Flood modelling* Presentation slides; Modelling packages with user manuals;					
Didactics	Formal lectures; classroom exercises; home assignments; exercises and workshops in computer lab;					
Additional reading:						