Name of Module	Water System Analysis			Course Code	WSA
Specialization	Core course	LM	WM	EM	RM
suitable for[25]					
mandatory for[2]			X		
Credit Points	SWS	Turn	Language		
5	3	Winter Term	English		
Prerequisites	Hydrology and Water Quality (WHQ), statistics, GIS and System Analysis (MRM)				
Learning Goals / Outcome	After completion of this module the participants will be able to • Understand the basic principles of water system modelling and the necessary steps for a successful model application. • distinguish different options of modelling, their requirements and complexity • Know about various models with respect to different fields of application • Run at least one mathematical model and one decision support system independently				
Content	1. Water system analysis principles 1.1 The role of systems analysis on water resource management 1.2 Decision under alternatives, multi-criteria decision making 1.3 Optimization 1.4 Adaptive management systems 1.5 Process, System, Model 1.6 Decision Support System 2. Classification of Models 2.1 Physically Based, analog models, stochastic and deterministic Models 2.2 Modelling uncertainty and sensitivity analysis 2.3 Spatial Distribution of Models 3. Mathematical Modeling 3.1 Collection and Analysis of Data (Pre-test) 3.2 Conceptual Design of a Model 3.3 Mathematical formulation of the conceptual design 3.4 Calibration of the Model 3.5 Validation of the Model 3.6 Model Application: Forcast vs. Prediction 4. Selected Models 4.1 DHI (mike Basin, Mike 11, MikeGIS, etc.) 4.2 Groundwater Modeling (MODFLOW, FeFlow) 4.3 Soil and Water Assessment Tool (SWAT) 4.4 Water Evaluation and Planning System (WEAP)				
Teaching methods	▪ Theory ▪ Individual project on tools for water resources management				
Assessment method	▪ Individual project presentation and oral defence				
Workload	lecture (h)	Exams (h)	Exercises, lab, term papers,	Field trips	

Please mark accordingly:
[25] check box for field(s) of specialization the module is **suitable** for
[2] check box for field(s) of specialization the module is **mandatory** for

attendance			presentation	
∑43	40	3		
Workload self study	**Self study lecture (h)**	**Self study exam preparation**	**Preparation/follow up exercises, lab, term papers, presentation**	**Preparation/ follow up field trips**
∑107	40	20	47	
Total Workload	150			
Module Coordinator	Prof. Dr. Roehrig			
Lecturer	Prof. Dr. Roehrig			
Recommended Reading	Handbooks of the applied software, including theoretical handbooks (MIKE 11, MIKE Basin, SWAT, etc.)			