

NAME: HYDROLOGY AND HYDRAULIC STRUCTURES							ECTS
							9
LEARNING OUTCOMES							
<p>On successful completion of this subject the student will be able to understand the hydrological cycle dynamic in watershed scale and to apply simple calculations in water balance and flow routing. The student will be able to design measures for controlling dynamic of sediment and to mitigate the hydraulic risk. Design of urban storm water drainage systems with simple methods will be also an outcome.</p>							
CONTENTS							
<p>Module 1: Hydrology. Introduction to hydrology: Historical review, Hydrological cycle, Hydrological data. Meteorology: Radiation, Temperature, Humidity, Atmosphere and air pressure, Wind, Precipitation, Evaporation. Drainage basin. Measurements in hydrology: Discharge, Water level, Velocity, Sedimentation. Runoff: Affecting factors, Rational method, Hydrograph method, Unit hydrograph, Synthetic hydrograph, and Return period. Flow routing models. Flow duration curve. Flow rating curve. Floods and droughts: Floods, Risk analysis, Droughts. Statistics in hydrology: Regression analysis, Curve fitting, Probability distributions. Urban Hydrology: Precipitation, Evaporation, Storm water runoff, Research development. Soil physics: Physical properties, Governing equations. Groundwater hydrology: Introduction, Groundwater in water cycle, Basic terms, Aquifer characteristics, Specific storage and specific yield, Groundwater budget, Effects of groundwater development.</p> <p>Module 2: Hydraulic structures. Hydraulic structures: Introduction, Design of hydraulic structures, Concepts and principles for sustainable hydraulic structures. Watershed sediments budget: Erosion, Natural factors, Sediment yield. Erosion control and protection: Erosion control measures, Erosion control structures, Check dams, Debris flow and torrent control structures. Sediment transport in rivers: Introduction, Water sediment mixture, Modes of transport, Settling velocity, Bed-load transport, Suspended-load transport, Total-load transport, Wash-load. Flood control measures and structures: Flood control measures, Flood protection structures, Dams and reservoirs, Flood plain detention, River confinement techniques. Storm water drainage design: Detention and retention facilities, Storm sewers.</p>							
TEACHING METHODS							
lectures	exercise	homework	use of software	laboratory	projects	seminar work	practical work
yes	yes	yes	yes	/	/	/	yes
PARTICIPATION OF DIFERENT EXAMINATION FORMS IN THE FINAL GRADE							
attendance	homework	colloquium	seminar work	writing exam	oral exam		
10%	20%	30%	/	/	40%		
LECTURE/TUTORIAL HOURS PER WEEK							
5+4							
PRIOR KNOWLEDGE:							
Mathematics II, Fluid mechanics							