Tárgytematika / Course Description

Hydraulic Engineering

NGM_ET131_1

Tárgyfelelős neve / Teacher's name: dr. Bene Katalin
Félév / Semester: 2016/17/1
Beszámolási forma / Assesment: Vizsga
Tárgy heti óraszáma / Teaching hours(week): 2/1/0
Tárgy féléves óraszáma / Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

Covered topics

This class covers theoretical and practical design aspects of hydraulic structures that transportation, and geotechnical engineers encounter. The class starts with a hydrology, and open channel flow overview. At first we will talk about design of stromwater-collection system, that will include street gutters, inlets, roadside, and median channels, and strom sewers. After we talk about of stormwater- management systems, spetial attention to stormwater controls measures. We will talk about design of drainge channels, and finallay design of hydraulic structures. Hydraulic structures will include, culverts, bridge openings, energy disippators, spillways, weirs, and dams. Steady and unsteady open channel flow problems, with sediment transport will be coverd as well. Computer programs such as SWMM, SSA and HY8 will be applied for different problems.

TANTÁRGY TARTALMA / DESCRIPTION

1

Introduction

2

Hydrology **Introduction to Highway Hydraulics (Ch2)**

3

Fundamental hydraulic concepts-Open Channel Flow **Introduction to Highway Hydraulics (Ch3, Ch4)**

4

Groundwater

5

Hydraulic structures (road, railroad design) **Introduction to Highway Hydraulics (Ch6)** Pavement drainage design

6

Hydraulic structures (road, railroad design) **Introduction to Highway Hydraulics (Ch5** Stable channel design

7

Hydraulic structures (road, railroad design) **Introduction to Highway Hydraulics (Ch8)** Storm drain design, drainage system construction, maintenance

8

Hydraulic structures (in road, railroad design) **Introduction to Highway Hydraulics (Ch9,10)** Culverts

9

Hydraulic structures (geotechnical engineering) **Hydraulic Structures (Ch1, 2, 3)** Dams

10

Hydraulic structures (geotechnical engineering) **Hydraulic Structures (Ch4, 5)** Dam appurtenances (spillways, overflow spillways, terminal structures)

11

Hydraulic structures (geotechnical engineering) **Design of Small dams**

Other structures

12

Mathematical modelling of hydraulic systems

13

Numerical modelling (Hec RAS, Autodesk storm and sanitary analyses)

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Homework

Culvert design

Stormdainage system design

Stable channel design

Presentation

Presentation of selected topic

Grading

Presentation 10%

Homewor 50%

Exam 40%

5 = 90 – 100%

4 = 80 – 90%

3 = 70- 80%

2 = 60-70%

1 = 0- 60%

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

Hydraulic Structures Fourth Edition

P. Novak, A.I.B. Moffat and C. Nalluri

School of Civil Engineering and Geosciences,

University of Newcastle upon Tyne, UK

and

R. Narayanan

Formerly Department of Civil and Structural Engineering, UMIST,

University of Manchester, UK

Hydraulic Design Series No. 4 Introduction to Highway Hydraulics FHWA-NHI-08-090 (HDS-4)

Design of Small dams United states department of the interior Bureau of reclamation: the third edition

Urban Drainage Design Manual the third edition of HEC-22

Hydraulic design of Highway culverts Third edition FHWA-HIF-12-026 HDS 5

Hydraulic Design of Energy Dissipators for Culverts and Channels, third edition of HEC-14

Design of Roadside Channels with Flexible Linings the third edition of HEC-15