# Tárgytematika / Course Description

## Hydraulic Engineering

### NGM_ET131_1

**Tárgyfelelős neve / Teacher's name:** dr. Bene Katalin

**Félév / Semester:** 2015/16/1

**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*

Water resources engineering topics, with review of hydrologic concepts will be included. Design of hydraulic structures, such as culverts and bridge openings, energy disippators, dam appurtenaces. Steady and unsteady open channel flow problems, with sediment transport will be coverd as well. Finally groundwater hydrology with special focus on engineering systems. Computer programs such as SWMM, SPSS and HY8 will be applied for different problems.

## TANTÁRGY TARTALMA / DESCRIPTION

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|---|---|
| **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) |

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|---|---|
| **11** | Hydraulic structures (geotechnical engineering) **Design of Small dams**<br>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