

OpenChannel Hydraulics(CENG3601) CourseOutline

1. Introduction
 - 1.1. Definition and Types of Open Channel
 - 1.2. Difference of open Channel flow and pipe flow
 - 1.3. Fundamentals equations
 - 1.4. Energy-Depth Relationships
2. Critical Flow
 - 2.1. Criterion for the critical state of flow
 - 2.2. Calculation of the critical depth
 - 2.3. Section factor and First Hydraulic Exponent
 - 2.4. Characteristics of Sub-critical and Super-critical flows
 - 2.5. Transitions
 - 2.5.1. Channel with a hump
 - 2.5.2. Transition with a change in width
 - 2.6. Choking
3. Uniform flow
 - 3.1. Concept and Establishment of Uniform flow
 - 3.2. Chezy Equation
 - 3.3. Manning's Formula
 - 3.4. Manning's Roughness Coefficient
 - 3.5. Uniform flow Computation
 - 3.6. The Hydraulic Efficient Channel Section
 - 3.7. Compound Sections
 - 3.8. Design of Irrigation Channels
4. Gradually Varied Flow
 - 4.1. Basic assumptions
 - 4.2. Differential Equation of GVF
 - 4.3. Classification of Flow Profiles
 - 4.4. Some Features of flow Profiles
 - 4.5. Analysis of Flow profiles
 - 4.6. Simple numerical Solution of the GVF equation
 - 4.6.1. Direct-step Method
 - 4.6.2. Standard-Step Method
5. Rapidly Varied Flow-1 Hydraulic Jump
 - 5.1. Definition and Types of Hydraulic Jump
 - 5.2. Basic Characteristics of the Jump
 - 5.3. Hydraulic Jump in a Horizontal Rectangular Channel
 - 5.4. Hydraulic Jumps in Horizontal non-Rectangular Channel
 - 5.5. Hydraulic Jumps as Energy Dissipater
6. Rapidly Varied Flow-2 Flow over Spillway and Undergates
 - 6.1. Sharp crested weir
 - 6.2. Broad crested weir
 - 6.3. Ogee-Spillway
 - 6.4. Critical depth Flumes
 - 6.5. Culvert Hydraulics
7. Hydraulics of Mobile Bed Channels
 - 7.1. Initiation of Sediment Flow
 - 7.2. Bed forms
 - 7.3. Sediment Load
 - 7.4. Design of Stable Channels
 - 7.5. Scour

Before mid-Semester Examination		No weeks
Introduction	1 LC	0.5
Critical Flow	1 LC + 2 TC	1.5
Uniform flow	2 LC + 2 TC	2
Gradual Varid Flow	2LC+2TC	2
Rapid Flow -1	1LC+1TC	1
Rapid Flow -2	1LC+1TC	1
Mobile Bed Flow	1LC+1TC	1
sum		9

Basic References:

1. Chow, V. T. (1959): Open Channel Hydraulics, McGraw-Hill, New York
2. Subramanya, K. (2009): Flow in Open Channels 3rd edition, Tata McGraw Hill Education Private Limited, New Delhi
3. Chanson, H. (2004): The Hydraulics of Open Channel Flow: An Introduction, 2nd edition Elsevier Butterworth-Heinemann Linacre House, Jordan Hill, Oxford OX28DP 200 Wheeler Road, Burlington
4. Sturm, T. W. (2001): Open Channel Hydraulics, International edition, McGraw-Hill Higher Education
5. All other related books and materials