Course Name:
Analysis and Design of Concrete Dams

Course Number:
20670

Credit:
3

Course Content (outline):

Introduction
Introduction

1. **Chapter 1: RCC Dams**
   1.1. Definition of dam, types and purposes of dams, Dams on Karoun River
   1.2. RCC Dams, Method Statement 1
   1.3. RCC Dams, Method Statement 2
   1.4. RCC Dams, Method Statement 3
   1.5. RCC Dams, Method Statement 4
2. **Chapter 2: Stability Analysis of CG dams**
   2.1. Stability Analysis of CG dams 1
   2.2. Stability Analysis of CG dams 2
3. **Chapter 3: Construction of Concrete Arch dams**
   3.1. Hoover Dam (Movie Presentation)
   3.2. Karoun III Dam and Hydropower (Movie Presentation; Design of Karoun 3 arch dam)
   3.3. Masjed Soleyman Dam and Hydropower (Movie and Power Point Presentation)
4. **Chapter 4: Dam Safety and Instrumentation**
   4.1. Dam Safety
   4.2. Iranian Approach to Dam Safety
   4.3. Instrumentation of Concrete and Embankment Dams
   4.4. Monitoring of Concrete and Embankment Dams
5. **Chapter 5: Reservoir's Equation**
   5.1. Reservoir's Equation 2.1
   5.2. Reservoir's Equation 2.2
   5.3. Viscosity 2.3-2.6
   5.4. Irrotational flow 2.7-2.8
   5.5. Reservoir boundary conditions 2.9
   5.6. Solution of the reservoir equation 2.10
   5.7. Reservoir truncated bc's 2.11
6. **Chapter 6: Finite Element modeling of the Dam-Reservoir System**
   6.1. Finite Element modeling of the structure
   6.2. Finite element modeling of the reservoir
   6.3. Coupling or Decoupling of the equations
7. **Chapter 7: Solution of Dam-Reservoir equations**
   7.1. Coupled Equations

7.2. Staggered method
7.3. α-Method+Energy Balance Error

8. **Chapter 8: Nonlinear Analysis**
   8.1. Nonlinear Analysis, LEFM vs. NLFM
   8.2. Smeared Crack Model, Damage Mechanics