



**Department of Water Resources Engineering**

**College of Engineering**

**University of Salahaddin-Hawler**

**Subject: Design of Earth dams**

**Course Book – (Year 4)**

**Lecturer's name: M. Yaseen Wsu Aziz**

**Academic Year: 2023/2024**

**Spring Semester**

## Course Book

<b>1. Course name</b>	<b>Design of Earth dams</b>
<b>2. Lecturer in charge</b>	<b>Yaseen W. Aziz</b>
<b>3. Department/ College</b>	<b>Dams &amp; Water Resources Engineering/college of Engineering</b>
<b>4. Contact</b>	<b>e-mail: yaseen.azeen@su.edu.krd Tel: (optional)</b>
<b>5. Time (in hours) per week</b>	<b>Theory: 2 Practical: 2</b>
<b>6. Office hours</b>	<b>10</b>
<b>7. Course code</b>	
<b>8. Teacher's academic profile</b>	I am graduated in 2012 B.Sc.-Dams and water Resources Engineering at Salahaddin University and I did my M.Sc. in 2016-in water Resources and Dam Engineering at Salahaddin University. Since 2016 till now I used by university of Salahaddin-college of engineering. During my work I taught (Fluid mechanic lab, Engineering drawing, Dams engineering II). In 2017 I attended an international conference holed in university of salahaddin-college of engineering
<b>9. Keywords</b>	Course subject, conference
<p><b>10. Course overview:</b> This course provides a comprehensive design of earth dam which include dam body and outlet works. In addition, a complete design of several types of spillway was taken among them Ogee spillway and side channel spillway. Also, most types of stilling basin are designed. It very important to introduce the basic principle of design of earth dams spillway components for students and major issues that may be arisen. During the course several software were utilized to check slope stability and seepage analysis.</p> <p>The subject matter is arranged into the following main parts:</p> <ul style="list-style-type: none"> <li>Earth Dam</li> <li>Foundation for earth dam</li> <li>Control seepage through dams</li> <li>Control seepage through foundations</li> <li>Drainage in earth dams</li> <li>Slope stability</li> <li>Selection of types of earth dams</li> <li>Maintenance and treatment of common troubles in earth dams</li> <li>Design of earth dams</li> <li>Spillways</li> </ul>	

Required capacity  
Types of spillways  
Design of ogee spillway

**11. Course objective:**

A course focuses on the design earth dam and its components including spillway, outlet works and energy dissipators. During the course several engineering programs were utilized for slope stability and seepage analysis. Students work in teams at class to solve the problems. In addition, students should do a complete design of an earth dam as homework at the end of the course.

To learn students how to:

- Treat different types of foundation
- Introduce types of earth dam and selection types for the proposed location
- Seepage analysis for different types of earth dam
- To introduce different methods for slope stability.
- Introduces different type of spillway, design each of them separately.
- The function of energy dissipators and hydraulic design

As a result of this course, students should be able to:

- Solve the weakness point of different types of foundation
- Control of seepage through foundation and dam body using different techniques
- Analysis of stability of side slopes of earth dam during different conditions
- Complete design of earth dam with outlet works with sketches
- Design different types of spillway including Ogee type, side channel spillway and free dropped spillway.

**12. Student's obligation**

However, under graduate education mainly stands on the teacher's role in the class to discuss the subject for student but students have a role in some situation. The responsibilities of under graduate students are: ready in the class at the specified time of the lecture and listen to the lecturer. Bring all the instruments and books that are required for the lecture. Participate in the discussion from the class and activities. Ask any question related to the subject if they don't understand or miss understand from the lecture. Some activities during the lecture should be doing with team work all students should be participated. At the end of each chapter home works is given to students including detail design of the structure or drawing of the structure or solution of a problem, each student should do them alone. Students should attend the lectures; the allowable absence during the year is 10% of total hours. Minimum four home works should be submitted during the year, Three to Four quizzes are required during the year.

**13. Forms of teaching**

To achieve the objectives of the course following forms and techniques will be followed during teaching process:

<p>1- Power point presentation for discuss the theoretical part of the lecture.</p> <p>2-White board will be used to explain theories, equations, solve problems and draw the structures in the class.</p> <p>3- Real images and video films will be used to simplify the shape of structures for the students</p> <p>4- Examples will be solved in the class through team work.</p>	
<p><b>14. Student learning outcome:</b>                  At the end of the course, the students can:</p> <ol style="list-style-type: none"> <li>Treatment any problem from different type of foundation</li> <li>Control seepage through the foundation and dam body</li> <li>Analysis of side slopes during different critical condition</li> <li>Design of bottom outlet</li> <li>Design of ogee, side channel and free dropped spillway</li> <li>Design different types of stilling basin</li> </ol>	
<p><b>15. Course Reading List and References</b></p> <p>References</p> <ol style="list-style-type: none"> <li>Varshney and Gupta (1983) "Theory &amp; Design of Irrigation Structure". Fifth edition, Vol.2, India.</li> <li>Khatsuria, R. M. (2005) "Hydraulics of Spillway and Energy Dissipators". Marcel Dekker, New york.</li> <li>Das, M.M. and Saikia, M.D., 2009. "Irrigation and water power Engineering". PHI Learning Pvt. Ltd.</li> <li>Arora, K.R., 2002. "Irrigation, water power and water resources engineering". Standard Publisher Distributors.</li> <li>Reclamation, U.B.O., 1987. "Design of small dams". Water Resources Technical Publication.</li> </ol>	
<b>16. The Topics:</b>	<b>Lecturer's name</b>
<p><b>Dam Engineering II</b></p> <ul style="list-style-type: none"> <li>- Introduction to Earth Dams and Types of Foundation</li> <li>- Seepage analysis and slope stability</li> <li>- Design of earth dam</li> <li>- Outlet works</li> <li>- Spillways</li> </ul>	<p><b>Yaseen W. Aziz</b></p> <p>2 weeks</p> <p>4 weeks</p> <p>3 weeks</p> <p>3 week</p> <p>2weeks</p>
<b>17. Practical Topics (If there is any)</b>	
<p>In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the</p>	<p>Lecturer's name                  ex: (3-4 hrs)</p>

lecture	ex: 14/10/2015
<b>18. Examinations:</b> No comments	
<b>19. Extra notes:</b> No comments	
<p><b>20. Peer review</b> <span style="float: right;">پیداچونہوہی ھاوہل</span></p> <p>This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.  <i>(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).</i></p> <p>ئەم كۆرسىبووكە دەبىت لەلایەن ھاوئێكى ئەكادىمىيەو سەير بكرىت و ناوهرۆكى بابەتەكانى كۆرسەكە پەسەند بكات و جەند وشەپەك بنوسىت لەسەر شىاوى ناوهرۆكى كۆرسەكە و واژووى لەسەر بكات.  ھاوئەل ئەو كەسەيە كە زانىارى ھەبىت لەسەر كۆرسەكە و دەبىت پلەى زانستى لە مامۇستا كەمتر نەبىت.</p>	