1. **Department, number, and title of course**

Department of Civil Engineering, CENG 5347, Irrigation Water Control and Management

2. **Required Course**

3. **Course (catalog) description**

The objective of this course is to familiarize students with the fundamentals of water control and its application in flow regulation and measurement in open-channel irrigation systems. Students will learn how water is controlled in irrigation systems in order satisfy crop water requirements.

4. **Prerequisite(s)**

MENG 3310, Fluid Mechanics, or equivalent course in Open Channel Flow

5. **Textbook(s) and/or other required material**

Notes prepared by the instructor

6. **Course Objectives**

- Describe the concept of hydraulic control and its use in flow regulation and measurement.
- Apply hydraulic control to dimension weir, flumes, and orifices.
- Design flow regulation structures based on flow level and discharge criterion.
- Identify the management implications associated with several types of flow measurement structures.
- Select the appropriate hydraulic structure based on both engineering and management considerations.

7. **Topics Covered**

- Social and physical aspects of water control
- Hydraulic Control in Open Channel Flow
- Physical Forms of Establishing Hydraulic Control
- Flow Regulation
- Measurement of Flow Discharge
- Sharp-Crested and Broad-Crested Weirs
- Basic and Gated Orifices
- Long-Throated, Zero-Throated, and Parshall Flumes
- Intake and turnout structures
- Check Structures
- Drop Structures

8. **Class/laboratory schedule, i.e., number of sessions each week and duration of each session**

LESSONS: 32 @ 50 min (2 att/wk)            LABS: 3 hrs/wk.
9. **Contribution of course to meeting the professional component**

3.0 Credit Hours (ES=2.5, ED=0.5)

Students completing this course will have the necessary design and operation knowledge needed to select the appropriate hydraulic control structure in a gravity flow irrigation system. This ability is crucial in establishing a fair and equitable distribution of a limited resources among competing users.

10. **Relationship of course to program outcomes**

The course director’s assessment of how this course contributes to the civil engineering program outcomes is listed below. The following scale is used:

1=No Contribution; 2=Small Contribution; 3=Average Contribution; 4=Large Contribution; 5=Very Large Contribution

<table>
<thead>
<tr>
<th>CIVIL ENGINEERING PROGRAM OUTCOMES</th>
<th>Course Director Assessment</th>
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<tbody>
<tr>
<td>Students who qualify for graduation with a civil engineering masters will demonstrate:</td>
<td></td>
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<tr>
<td>Have specialized knowledge in an area of civil engineering beyond that normally expected at the undergraduate level.</td>
<td>5</td>
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<tr>
<td>Are adequately prepared for advanced professional practice.</td>
<td>4</td>
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<tr>
<td>Completing a thesis or design project address a civil engineering problem using sound engineering principles and techniques.</td>
<td>4</td>
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<tr>
<td>Solve an engineering problem of importance to the State, the Nation, or the Global community.</td>
<td>4</td>
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<tr>
<td>Demonstrate the ability for independent life-long learning.</td>
<td>4</td>
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<tr>
<td>Have effective oral, written, and graphical communication skills.</td>
<td>3</td>
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11. **Person(s) who prepared this description and date of preparation**

Dr. Peter D. Rogers, PE, Assistant Professor, 9 June 2008.