

Biological & Irrigation Engineering
BIE 5520 –Irrigation Project Operation and Maintenance
Elective Course

Course Description: (2007-2009 General Catalog)

Organizing, administering, and financing irrigation and drainage projects. Operation and maintenance of irrigation distribution systems. Simulation of command area water demands. Transferring irrigation project O&M to water user organizations.

Prerequisites: BIE 5010.

Textbooks:

1. *Irrigation Maintenance and Operations Learning Process*, 1996, G.V. Skogerboe and G. P. Merkley. Water Resources Publications, LLC, Highlands Ranch, CO. 358 pages.
2. *Establishing Sustainable Farmer-Managed Irrigation Systems*, 2003, G.V. Skogerboe, G.P. Merkley, and R.F. Rifenburg. www.greatunpublished.com. 332 pages.
3. *User's Guide & Technical Reference: RootCanal Hydraulic Model*, 2005, G.P. Merkley.
4. *Management, Operation, and Maintenance of Irrigation and Drainage Systems*, 1991, W.R. Johnston and J.B. Robertson, ASCE Manual #57. 432 pages.

Course Outcomes:

1. Introduction to the operation and maintenance of irrigation projects.
2. Ability to formulate operations plans.
3. Ability to formulate maintenance plans.
4. Ability to formulate, determine required data, apply appropriate analytical techniques, and solve problems related to irrigation project O&M.
5. Ability to use spreadsheet software to perform engineering calculations, and produce graphs for seepage losses and other technical problems.
6. Ability to evaluate the maintenance needs of an irrigation project by means of a field visit and subsequent analysis.
7. Understanding of current operation/management and maintenance trends and practices in agricultural irrigation projects.

Topics Covered:

O&M concepts
Maintenance and operations
M&O Implementation
Maintenance: problems and solutions
Maintenance: surveys
Maintenance: plans & accountability
Operations: seepage losses
Operations: developing a plan
Operations: software-based plans

Operations: canal gate automation
 Operations: canal gate automation
 Operations: ME&F
 Operations: tertiary & improvements plan
 Organizations: introduction
 Organizations: case studies
 Organizations: farmers & agencies
 Organizations: organizational design
 Organizations: institutional arrangements
 Organizations: management agreement
 Organizations: management implementation
 Organizations: sustainability
 Maintenance walk-thru survey and review
 Field trip to Weber Basin Conservancy District

Class Schedule: Two 75-minute classes per week. Three semester credits. Tuesdays and Thursdays, 10:30 – 11:45 am. Course consists of lectures, problem solving, field exercises, and group discussions.

Contribution of course to meeting the professional component: This course is a comprehensive treatment of the operations and maintenance of agricultural irrigation projects. Skills of basic hydraulic calculations, design, calibration, method selection, technical analysis, and many related topics are utilized.

Relationship of course outcomes to program outcomes for ABET:

Course Outcome	Program Outcome
1, 2, 3, 4, 5, 6	(a) an ability to apply knowledge of mathematics, science, and engineering
1, 2, 3, 4, 5, 6	(b) an ability to design and conduct experiments, as well as to analyze and interpret data
1, 2, 3, 4, 5, 6	(e) an ability to identify, formulate, and solve engineering problems
7	(j) a knowledge of contemporary issues
1, 2, 3, 4, 5, 6	(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Prepared by: Gary Merkley, June 2008