

**UNIVERSITY OF MANITOBA
DEPARTMENT OF BIOSYSTEMS ENGINEERING**

COURSE OUTLINE

BIOE 0690 WATER MANAGEMENT (3-L:0-0) 4 CREDITS

INSTRUCTOR

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OBJECTIVES

To introduce Diploma Agriculture students in this course to the basic theoretical principles and practical skills in the preparation, construction and usage of farm-scale irrigation, drainage, and water storage projects. Students successfully completing this course should be able to design small projects themselves and, in larger projects they should be able to deal as well informed and knowledgeable partners with consultants, contractors, institutions and government agencies.

LECTURES

Two hours of lectures per week in the fall term. Lectures may be supplemented with handouts.

1. Surveying
 - 1.1 Introduction to levelling
 - 1.2 Differential levelling
 - 1.3 Profile levelling
 - 1.4 Contour levelling
 - 1.5 Measuring distance
 - 1.6 Land survey systems
2. Agricultural Drainage
 - 2.1 Introduction to drainage
 - 2.2 Surface ditch design
 - 2.3 Earthwork computations for ditch excavation
 - 2.4 Land forming
 - 2.5 Subsurface drainage
3. Farm Water Supply
4. Irrigation
 - 4.1 Purposes of irrigation
 - 4.2 Methods of irrigation
 - 4.3 Evapotranspiration
 - 4.4 Irrigation requirement
 - 4.5 Irrigation efficiency
 - 4.6 Pump selection
5. Water Rights Act

LABORATORIES

One two-and-a-half-hour laboratory period per week. The first five laboratory periods involve surveying outdoors with the indoor part of the survey as homework assignments. The rest of the laboratory periods are on various design problems which are initiated in the classroom but require completion at home.

1. Surveying
 - 1.1 Orientation to levelling
 - 1.2 Differential levelling
 - 1.3 Profile levelling
 - 1.4 Contour levelling
 - 1.5 Distance measurement

2. Design
 - 2.1 Contour mapping
 - 2.2 Surface drainage ditch design
 - 2.3 Earthwork volume calculation
 - 2.4 Farm dugout design
 - 2.5 Pumping requirements

EVALUATION

The basis for final evaluation is given below. The normal range of weights assigned to various components of the work is:

- 50% on final examination
- 30% on two mid-term tests (**October 8, 2008** and **November 5, 2008**)
- 20% on assignments and preparation for the assignment

The survey field notebooks are generally due at the end of each lab. The tutorial assignments are due on Fridays. Late submission is penalized at 10% per day. Some evaluative feedback will be given before the VW deadline date.

ACADEMIC DISHONESTY

Assignments and laboratory reports are expected to be the independent work of each student. The **General Academic Regulations and Policy**, as outlined in the **Undergraduate Calendar**, will be followed in case of academic dishonesty.

TEXTBOOK

No textbooks are required. However, the student is expected to acquire the following:

A field book, e.g. Sakkisha Field Book S360, available in the Drafting Supplies Section of the University Bookstore or at or Lewis Instruments, 1438 Erin Street, Winnipeg.