

**The University of Western Ontario - Faculty of Engineering  
Department of Civil and Environmental Engineering**

**CEE 3361b – Water Resources Management  
- Course Outline 2011/12**

This course presents introduction to water resources management for civil and environmental engineers. It covers broad range of topics relevant to current water resources management practice. Students will be exposed to methods and tools for effective management of water resources. Course will introduce Ontario water management rules and regulations and water management issues in the Upper Thames River Basin. The general objectives are for the student to become able to:

- Use engineering approach in addressing water resources management problems by understanding: definition of integrated water resources management; principles of sustainable development; characteristics of various management tools; various uses of water; water supply issues; and water demand issues.
- Understand and use the systems approach to water resources management.
- Develop an awareness of rules and regulations governing water resources management in Ontario and the Upper Thames River basin.
- Recognize the need for life-long learning, interdisciplinarity and use of systems approach in civil and environmental engineering as one of the cognitive paradigms for understanding complexity.

**Calendar Copy:**

Introduction to water resources management for engineers. Course topics include: water resources management principles; regulatory issues; management of water resources for sustainable development; tools for water resources management; economic analysis; water supply; water demand; climate change and water resources management; extremes (floods and droughts); water management in the Upper Thames River basin. Exposure to, and use of computer-based tools in solving water resources management problems.

3 lecture hours; 2 tutorial hours; half course

**Prerequisites:**

CEE2219; ES3340

**Note:** It is the **student's responsibility** to ensure that all Prerequisite and Corequisite conditions are met or that special permission to waive these requirements has been granted by the Faculty. It is also the **student's responsibility** to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Corequisite or Antirequisite conditions.

**Corequisites:**

None

**Antirequisites:**

None

**Contact Hours:**

3 lecture hours/week; 2 tutorial hours; (recommended additional personal study - 5 hours). Attendance at the tutorial session is **mandatory**.

**Instructor:**

Dr. Slobodan P. Simonovic, Ph.D., P.Eng., ESB 3115, email: simonovic@uwo.ca. *Administrative support:* Room 3005.

**Textbook:**

Selected sections from:

Simonovic, S.P. *Managing water resources: Methods and tools for a systems approach*, Earthscan, London, Sterling VA, 2009. (Purchase recommended);

Chin, D.A., *Water-resources Engineering*, Prentice Hall, Upper Saddle River, NJ, 2006. (Purchase recommended); and

additional material to be made available on the course web site.

**Other References:**

Loucks, D.P., and E. Van Beek, *Water Resources Systems Planning and Management*, UNESCO, Paris, 2003. (Purchase optional).

**Computing:**

Assignments will require the use of computer tools to be provided by the instructor.

**Units:**

SI units will be used in lectures and examinations

**Specific Learning Objectives:**

1. Introduction. At the end of this section, the student should be able to:
  - a) Understand definitions of integrated water resources management; sustainable development; water purposes; water supply and water demand.
  - b) Use the water resources management process steps, concept of mathematical modelling and understand the utility of various water resources management tools.
2. Legal and regulatory issues. At the end of this section, the student should be able to:
  - a) Interpret rules and regulations guiding water resources management in the Province of Ontario.
  - b) Understand water resources management issues in the Upper Thames River basin.
3. Water resources management tools. At the end of this section, the student should be able to:
  - a) Use benefit-cost analysis for a water resources project (economic tools).
  - b) Use systems approach for addressing complex water resources management problems.
  - c) Use simulation, optimization and multi-objective analysis tools in water resources management (systems tools).
4. Climate change and water resources management. At the end of this section, the student should be able to:
  - a) Understand the impacts of climate change on water resources management.
  - b) Understand management of extremes (floods and droughts).

Instructor may expand or modify the material presented in the course as appropriate.

### **General Learning Objectives**

Knowledge Base	x	Individual Work	x	Ethics and Equity	
Problem Analysis	x	Team Work		Economics and Project Management	x
Investigation		Communication		Life-Long Learning	x
Design		Professionalism	x		
Engineering Tools	x	Impact on Society	x		

### **Evaluation:**

The final course mark will be determined as follows:

Assignments:	50%
Final Exam:	50%
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Total	100%

**Students must pass the final examination to pass this course. Students who fail the final examination will be assigned the aggregate mark, as determined above, or 48%, whichever is less.**

#### 1. Assignments

Due date for all assignments will be one week after the distribution of assignments. The following objectives are set for the course assignments:

- 1 Basic calculations and units for water management
- 2 Watershed management systems formulation
- 3 Hydrologic and hydraulic analyses
- 4 Reservoir sizing and hydropower
- 5 Detention pond routing and weir design
- 6 Water supply project
- 7 System formulation problem
- 8 Economic feasibility
- 9 System dynamics simulation problems
- 10 Reservoir operations
- 11 Optimization of water quality management
- 12 Multi-objective selection of alternatives

#### 2. Final exam

The final examination will be **closed book** exam and will cover all course material. Only approved programmable calculators are permitted in the final exam. No communication devices will be allowed in the room during the exam.

**4. Use of English**

In accordance with Senate and Faculty Policy, students may be penalised up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

**Plagiarism Checking:**

The University of Western Ontario uses software for plagiarism checking. Students are required to submit their Laboratory Reports in electronic form to Turnitin.com for plagiarism checking.

**Cheating:**

University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that might include expulsion from the program. If you are caught cheating, there will be no second warning. For more information on scholastic offenses, please see:

[http://www.uwo.ca/univsec/handbook/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf)

**Attendance:**

Any students who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.

**Accessibility:**

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

**Conduct:**

Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others. Please turn off your cell phone before coming to a class, tutorial or exam. On the premises of the University or at a University-sponsored program, students must abide by the Student Code of Conduct: <http://www.uwo.ca/univsec/board/code.pdf>

**Sickness and Other Problems:**

Students should immediately consult with the Instructor or Department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented (see attached). The student should seek advice from the Instructor or Department Chair regarding how best to deal with the problem. Failure to notify the Instructor or Department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal. For more information concerning medical accommodations, please see:

[http://www.uwo.ca/univsec/handbook/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf)

**Notice:**

Students are responsible for regularly checking their email and notices posted outside the Civil and Environmental Engineering Department Office.

**Consultation:**

Students are encouraged to discuss problems with their teaching assistant and/or instructor in tutorial sessions. Office hours will be arranged for the students to see the instructor and teaching assistants. Other individual consultation can be arranged by appointment with the appropriate instructor.

**Course breakdown: Basic Science = ? AU's; Engineering Science = ? AU's; Engineering design = ? AU's; Complementary Studies = ? AU's; Mathematics = ? AU's.**

**Additional information:**

Additional important rules and regulations are attached.