SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

Semester 2 2013 Course Profile

CVEN 3502 Water and Wastewater Engineering

(Amended 17 July 2013)

COURSE DETAILS

Units of Credit 6
Contact hours 5 hours per week

Lectures Tuesday 2:00pm – 4:00pm CLB7
Thursday 11:00am – 12:00pm CLB7

Tutorials* Thursday 12:00am – 2:00pm Various rooms

Laboratories** Monday 9:00 – 11:00 Vallentine Annexe
Tuesday 9:00 – 11:00 Vallentine Annexe

(Tutorials* and Laboratories** - see page 5)

Course Coordinator and Lecturer
Prof. Richard Stuetz
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Lecturer Dr Bruce Cathers
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Course Assistant Dr Nhat Minh Le
Email: minh@unsw.edu.au

INFORMATION ABOUT THE COURSE

The course introduces students to the principles of water and wastewater engineering, including water supply and wastewater disposal systems, water and wastewater treatment, water quality and indicators, open channel flow, pump selection and placement and pipe networks. Topics include water quality parameters, guidelines and water quality frameworks; unit operations in treatment of water and wastewater; sewage collection systems; pumping stations and rising mains, sludge treatment and management, and water management concepts and effluent reuse.

HANDBOOK DESCRIPTION

See CVEN3502 online handbook:

OBJECTIVES

The learning objectives for this course are for you to understand:

- water and wastewater distribution and collection systems and their roles in the water cycle;
- basic water quality issues associated with water and wastewater treatment;
- design and operation of sewerage collection systems and water distribution;
- environmental implications and assessment of wastewater discharge;
- treatment options and principles of conventional treatment systems;
- fundamental design issues for open channel flows, pipes and pumping systems.

Thus, this course provides an introduction to water and sewerage system structures/design principles, water quality guidelines and objectives, water treatment and wastewater treatment and the environmental issues related to treatment.

TEACHING STRATEGIES

<table>
<thead>
<tr>
<th>Private Study</th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Assessments</th>
<th>Laboratory Work</th>
<th>eLearning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review lecture material and reading</td>
<td>Find out what you must learn</td>
<td>Be guided by tutorial questions and additional reading</td>
<td>Demonstrate your knowledge and skills</td>
<td>Hands on work to set studies in context</td>
<td>Lecture notes will be placed in the Resources folder of BLACKBOARD. Worked Tutorial Solutions will be placed there 1 to 2 weeks after the Tutorial.</td>
</tr>
<tr>
<td>Do set problems and assignments</td>
<td>Summarise essential course material from lectures and associated reading</td>
<td>Practice solving set problems</td>
<td>Demonstrate higher understanding and problem solving</td>
<td>You need to record results during the lab session and complete a laboratory report with these findings discussed.</td>
<td></td>
</tr>
<tr>
<td>Reflect on class material and assignments</td>
<td>Hear announcements on course changes and arrangements</td>
<td>Ask questions</td>
<td>Do not copy sections from textbooks, always use appropriate references for sourced material</td>
<td>Ask questions for clarification during laboratory classes.</td>
<td></td>
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</table>
Email

- You should check your emails daily to be sure that you are aware of any CVEN3502 course announcements or arrangements. Moreover, you must maintain your email inbox to ensure that it does not fill up and bounce any incoming emails.

EXPECTED LEARNING OUTCOMES

During the course you will be expected to understand the concepts relevant to water and wastewater treatment unit operations, wastewater collection systems and the distribution of water and how guidelines are used to determine the expected water and wastewater quality from these process systems.

To aid with the formal lecture contact time you will be expected to read additional material from lectures and be given appropriate chapter references in textbook references for further background knowledge. Tutorial problems will provide problem solving for individual sections and assignment will put into practice your overall understanding of water and / or wastewater treatment systems.

For each hour of contact it is expected that you will put in at least 1.5 hours of private study.

ASSESSMENT

The final course mark will be based on you completing the coursework and final examination:

(i) your coursework mark accounts for 40% of the course, and
(ii) your final examination mark accounts for 60% of the course.

Provided a mark of 40% or more has been achieved in your final exam and a mark of 40% or more has been achieved in your coursework component, your final aggregated mark for this course will normally be based on the sum of the scores from each of the assessment tasks with your final examination being worth 60% of the final mark and your class work being 40% of the final mark.

However, if a mark of 40% has not been reached or exceeded in the final exam, your course mark will be the final exam mark alone, expressed as a percentage.

The laboratory work is a compulsory component of this course. Failure to attend the laboratory work may result in an Unsatisfactory Fail, irrespective of your exam mark.

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Assignment Details</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz (15%)</td>
<td>Multiple choice quiz</td>
<td>Week 6</td>
</tr>
<tr>
<td>Lab (10%)</td>
<td>More information will be supplied on eLearning</td>
<td>Weeks 2-13</td>
</tr>
<tr>
<td>Hydraulics Assignment (15%)</td>
<td>Topic: Open Channel Flow</td>
<td>Week 11</td>
</tr>
</tbody>
</table>

Penalties for late submission: late work will be penalised at the rate of 10% per day after the due time and date have expired. Work submitted late during or past a weekend will count as 2 days.
## COURSE PROGRAM

**SEMESTER 2 2013**  
(29 July – 28 October)

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Lecture (Tuesday) 2 – 4pm (2 hrs)</th>
<th>Lecture (Thursday) 11am-12noon (1hr)</th>
<th>Tutorial (Thursday)* 12noon-2pm (2 hrs)</th>
<th>Laboratory**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29/7</td>
<td>Introduction (2hrs)</td>
<td>Water Quality (1hr)</td>
<td>No Tutorial</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>5/8</td>
<td>Flowsheeting (2hrs)</td>
<td>Disposal (1hr)</td>
<td>Water and Effluent Quality</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>12/8</td>
<td>Physical Processes (2hrs)</td>
<td>Guidelines (1hr)</td>
<td>Screening &amp; Sedimentation</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>19/8</td>
<td>Chemical Processes (2hrs)</td>
<td>Sludge Management (1hr)</td>
<td>Revision of Pipe Flow</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>26/8</td>
<td>Biological Processes (2hrs)</td>
<td>Odour Management (1hr)</td>
<td>Wastewater Treatment</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>1/9</td>
<td>Membrane Processes (2hrs)</td>
<td>Quiz (approx. 1 hr)</td>
<td>No Tutorial</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>9/9</td>
<td>Open Channel Flow 1</td>
<td>Open Channel Flow 2</td>
<td>Uniform Flow</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>16/9</td>
<td>Open Channel Flow 2</td>
<td>Optimal Sections (1hr)</td>
<td>Optimal Sections</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>23/9</td>
<td>Open Channel Flow 4</td>
<td>Open Channel Flow 5</td>
<td>Specific Energy &amp; Channel Transitions</td>
<td>Yes</td>
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</tbody>
</table>

* Week 3 is marked as requiring revision of pipe flow.

**Laboratory**

- **Introductions**: 2hrs
- **Water Quality**: 1hr
- **Disposal**: 1hr
- **Guidelines**: 1hr
- **Sludge Management**: 1hr
- **Odour Management**: 1hr
- **Quiz**: approx. 1 hr
- **Open Channel Flow 1 and 2**: Uniform Flow
- **Open Channel Flow 3**: Specific Energy
- **Open Channel Flow 4**: Channel Transitions
- **Open Channel Flow 5**: Hydraulic Jumps

Semester Recess (30 Sept – 4 Oct)
### RELEVANT RESOURCES

- Additional material will be provided on eLearning (Blackboard) and available in the UNSW Bookshop for purchase.
- No past exam papers available.

**Additional reading:**


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<tr>
<th>Date</th>
<th>Topic</th>
<th>Notes</th>
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</table>
| 10/7/10 | Open Channel Flow 5  
Hydraulic Jumps  
(1hr) | Open Channel Flow 6  
Gradually Varied Flow  
(1hr) | Yes |
| 11/14/10 | Pumps 1  
Types of Pumps (1hr) | Pumps 2  
Pump Placement (1hr) | Gradually Varied Flow  
Yes |
| 12/21/10 | Pipes 1  
Pipe Networks (2hrs) | Pipes 2  
Pipe Networks (1hrs) | Pumps  
Yes |
| 13/28/10 | Guest Lecture (1 hr)  
Water Distribution  
Systems  
(not confirmed) | Pumps & Pipe  
Networks  
Yes |

*Tutorials*
Your attendance at Tutorials will be recorded in the room your have registered in.

**Laboratory sessions**
You will need to register for a laboratory group via eLearning in week 1. You will only need to attend one laboratory session during weeks 2-12. Two laboratory sessions will be scheduled each week for a max of 20 students. The laboratory session will be composed of two 1 hour sessions on water quality (jar test) and hydraulics (open channel flow and pumps). After 60 minutes the two halves of the laboratory groups (10 per group) will swap over. The course content covered in these Laboratory sessions is examinable in the final exam.
The School of Civil and Environmental Engineering evaluates each course each time it is run through (i) the UNSW Course and Teaching Evaluation and Improvement (CATEI) process, and (ii) Focus Group Meetings.

As part of the CATEI process, your student evaluations on various aspects of the course are graded; the Course Coordinator prepares a summary report for the Head of School. Any problem areas are identified for remedial action, and ideas for making improvements to the course are noted for action the next time that the course is run.

Focus Group Meetings are conducted by the four Year Managers (academic staff) for any students who wish to attend, in each year of the civil and/or environmental engineering programs. Student comments on each course are collected and disseminated to the Lecturers concerned, noting any points which can help improve the course.

Common School Information

Refer to Common School Information on the School website available at:
http://www.civeng.unsw.edu.au/info-about/our-school/policies-procedures-guidelines/academic-advice

To navigate to this web page from the Civil and Environmental Engineering School Home page:
Info About » Our School » Policies, Procedures & Guidelines » Academic Advice

The Common School Information site has information on the following:

1. Dates to Note - important dates relating to enrolling and disenrolling, and a University website (via MyUNSW) with a calendar of other important UNSW dates (semester dates, recess weeks, stuvac dates and exam periods).
2. School Contacts
   i. for enrolment or timetable difficulties,
   ii. referral chain of contacts for course difficulties:
      Course Coordinator/Lecturer → Year Coordinators → Grievance Officer,
   iii. Advanced Standing, and
   iv. Mentoring.
3. Course Requirements
   i. attendance at lectures, tutorials and laboratory classes,
   ii. participation in tutorials, and
   iii. completion of assessment work.
4. Notes on Assessment
   i. plagiarism (with link to UNSW Learning Centre web site on plagiarism),
   ii. keep a copy of written submissions,
   iii. submitting assignments, and
   iv. late submissions (obtaining extensions and special consideration)
5. Supplementary Exams – includes link to School website with School policy on supplementary exams.
   i. Special Consideration – includes link to UNSW website (New South Q) for downloading forms, requirements for lodging special consideration forms.
6. Solutions to Problems – Troubleshooters
   i. Learning Centre,
   ii. student counsellors, and
   iii. student support services.
7. CEVSOC – student committee membership and link to (unofficial) student CEVSOC website.