CIVL2130 / ENVE2602

Hydraulics I / Environmental Fluid Mechanics

Dr. Marco Ghisalberti
Dr. Tongming Zhou

Civil & Resource Engineering and Environmental Systems Engineering
Faculty of Engineering, Computing and Mathematics

UNIT OUTLINE
Semester 2 2010
ESSENTIAL ADMINISTRATIVE INFORMATION

Unit Title
Hydraulics I (Civil and Resource Engineering students)
Environmental Fluid Mechanics (Environmental Systems Engineering students)

Unit Code
CIVL2130 / ENVE2602

Unit Coordinator
Dr. Marco Ghisalberti

Credit Value
6 points

Handbook Website
http://units.handbooks.uwa.edu.au/units/enve/enve2602

Unit Website
Available through My WebCT, or directly at:
https://webct.uwa.edu.au/webct/logon/882974304011

Contact Hours
Lectures: Monday 10 AM (Ross LT - Physics)
Tuesday 12 PM (Wilsmore LT - Chemistry)
Thursday 9 AM (Wilsmore LT - Chemistry)

Tutorials: 3 sessions per week (open to all students)
Monday 12 PM (Engineering Lecture Theatre1)
Thursday 1 PM (Murdoch LT - Arts)
Friday 12 PM (Engineering Lecture Theatre1)

Labs: 3 throughout semester (G.95 in Engineering building)

Important Notice
The Unit Outline (this document) gives the student important information about the unit, aims, outcomes, materials, programme and assessment.

Note that important information relating to policies, examinations, expectations, copyright, referencing, academic misconduct and assistance with communication skills is available on the Faculty website though http://www.ecm.uwa.edu.au/studentnet/exams.

You are required to be aware of and fulfill your responsibilities under the University’s rules, policies and procedures so it is important that you review the content of these in detail.
UNIT COORDINATOR

Every unit has a person who is responsible for the overall administration of that unit. This person is the Unit Coordinator. If you cannot contact the person who is teaching you or if you have further queries about this unit, you may wish to contact the Unit Coordinator.

<table>
<thead>
<tr>
<th>Unit Coordinator:</th>
<th>Dr. Marco Ghisalberti</th>
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<tbody>
<tr>
<td>Email:</td>
<td><a href="mailto:marco.ghisalberti@uwa.edu.au">marco.ghisalberti@uwa.edu.au</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>6488 2408</td>
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<tr>
<td>Fax:</td>
<td>6488 1015</td>
</tr>
<tr>
<td>Building:</td>
<td>Environmental Systems Engineering</td>
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<tr>
<td>Room:</td>
<td>1.12</td>
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TEACHING STAFF

Your lecturer: Dr. Tongming Zhou

| Email:            | tzhou@civil.uwa.edu.au |
| Phone:            | 6488 7094             |
| Fax:              | 6488 1018             |
| Building:         | Engineering           |
| Room:             | 1.92 B                |

INTRODUCTION

This unit provides an introduction to fluid statics and fluid dynamics. The topics covered include fluid properties, hydrostatics, the bulk equations of motion, the Bernoulli equation, dimensional analysis, experimental design, pipe flow, pipe networks, the Navier-Stokes equations and plane flow. There is also an introduction to fundamental concepts of fluid mechanics such as turbulence, waves and drag.

LEARNING OUTCOMES

On successful completion of this unit you will be able to:

1. Appreciate the meaning and relevance of mechanical fluid properties.
2. Understand the fundamental conservation laws (mass, momentum, energy) of fluid mechanics and be able to apply them to analyse engineering problems.
3. Write the equations that describe fluid motion both for a control volume and at a single point, and to know when to choose between the two approaches.
4. Write, and understand the meaning of, the important dimensionless numbers in fluid mechanics.
5. Design laboratory models whose fluid mechanics replicate those of the prototype.
6. Use an order-of-magnitude approach to simplify the differential equations of motion to the point where they can be solved using basic calculus.
STUDENT FEEDBACK

We welcome your feedback as one way to keep improving this unit. Later this semester, you will be encouraged to give unit feedback through SURF, UWA's online student feedback system, and SPOT.

In response to 2009 student feedback, we have made the following changes to the unit:

1. Moved the final test to the exam period (it was held in Week 13 of semester in 2009).
2. Ensured that all tutors & lab demonstrators speak fluent English.
3. Unclear questions in the lab reports have been re-written.

TEXT BOOK & RESOURCES

Recommended Texts:

You do not have to purchase the following textbook but you may like to refer to it.


This textbook is available in the bookshop, and on reserve in the Science library.

A summary of the lecture material and other items, such as practice problems & lab notes, will be available on the unit website.

TUTORIALS

There will be weekly tutorials starting in the second week of semester. There are no tutorial groups, and every tutorial session is open to all students. There will be 3 tutors at each tutorial session.

- There are no assignments in this unit. Your preparation for the tests will involve solving practice problems that the teaching staff will post on the unit website. Problems will only be posted when you are able to do them. Problems will be accompanied by final answers only, not complete solutions. You will do well in this unit if you keep up-to-date with the practice problems.

- You are strongly encouraged to attend as many tutorial sessions as you need to fully understand all of these problems. The tutors are a resource that you should use as much as necessary.

- You are being asked to take responsibility for your own learning in this unit. Leaving all the practice problems for the weekend before the test will almost certainly see you fail the unit.

The tutors are:

Lionel Lam  
(10758440@student.uwa.edu.au)  

Mehran Rahmanian  
(rahmanian@civil.uwa.edu.au)  

Andrew Zulberti  
(20270917@student.uwa.edu.au)
LABORATORIES

Laboratories begin in Week 4 of semester (the week beginning August 16th). They are held in the Hydraulics Lab (G.95) in the main Engineering building.

There are 3 laboratory sessions:
- Swan River Model (SRM)
- Transition To Turbulence (TTT)
- Conservation Of Energy (COE)

Before the lab session

Allocation of laboratory groups is done initially through OLCR. Ignore the lab group number that you are given on OLCR; that allocation is for the unit coordinator’s benefit only. Everyone’s actual lab group number and lab schedule will be posted on the unit website in a spreadsheet entitled “Lab schedule and group listings”.

Instructions for each of the three labs will be posted on the unit website. You must read through the instructions before your lab session, as there are pre-lab questions that must be completed.

Attending the lab session

You must attend all 3 sessions and are required to submit each lab report for assessment. Attendance will be taken at each lab session. Failure to attend a session, without notifying the laboratory coordinator, will result in a mark of zero being awarded for the lab component of the assessment.

Please note that the 3 labs start at different times throughout each session. On the unit website, please read the document entitled “Important information about labs”. This will tell you which lab you will be doing on any given day and what time you must arrive at the Hydraulics Lab. You will need your lab group number to do this.

Writing your lab report

Please read the document on the unit website entitled “Guidelines for lab reports”.

The labs are related to, but do not directly follow on from, the lecture material. They involve concepts that may not be covered in class; lab demonstrators will run a short tutorial before each session. You may have to do a lab before the related material is covered in the lectures.

Students are encouraged to use the unit website calendar to check the due dates of lab reports.

ASSESSMENT DETAILS

Assessment Mechanism

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<thead>
<tr>
<th>Assessment Tasks</th>
<th>Worth</th>
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<tbody>
<tr>
<td>3 two-hour tests</td>
<td>80%</td>
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<tr>
<td>3 lab reports</td>
<td>20%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
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Your unit mark is subject to the Mark Adjustment Policy within the Faculty of Engineering, Computing and Mathematics. It is in your interest to learn about this Policy at http://www.ecm.uwa.edu.au/for/students/assess

**SUBMISSION DETAILS**

All lab reports must be handed in to the assignment boxes on the ground floor of the Environmental Systems Engineering building. (Map: http://www.sese.uwa.edu.au/aboutus/location)

There is a **25% per day penalty** for late submission of lab reports.

**Academic Conduct**

It is a University requirement that all newly enrolled students complete a short compulsory online unit called Academic Conduct Essentials (ACE) within the first 10 weeks of semester. ACE can be accessed via WebCT (http://webct.uwa.edu.au/webct/entryPagelns.dowebct).

**STUDENTS’ RIGHTS AND RESPONSIBILITIES**

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter,
- the University’s Guiding Ethical Principles,
- the University’s policy and statements on plagiarism and academic integrity,
- copyright principles and responsibilities,
- the University’s policies on appropriate use of software and computer facilities,
- the use of calculators in exams
- students’ responsibility to check enrolment,
- deadlines, appeals, and grievance resolution,
- student feedback,
- other policies and procedures
- electronic communication with students

See http://www.ecm.uwa.edu.au/studentnet/exams for comprehensive information on all of the above.

**ADDITIONAL INFORMATION**

**Telephone Contacts:**

If you have a query relating to administrative matters such as:-

- requests for deferment of study
- difficulties with accessing online study materials
- obtaining assessment results

please contact your Unit Coordinator.

If you have a query relating to other matters such as:-

- missed assessments
- missing part of Semester
- being considered for special consideration

please contact the Associate Dean (Students):

Dr Jennifer Hopwood
6488 3061
sub.dean@ecm.uwa.edu.au