CVEN2501 Principles of Water Engineering

Semester 1, 2016

Never Stand Still | Faculty of Engineering | School of Civil and Environmental Engineering

COURSE DETAILS

Units of Credit	6	
Contact hours	5 hours per week + **1.5 hours laboratory session + 3 hours on site for visit to Hydraulics laboratories.**	
Lectures	Mon 2:00PM - 4:00PM Tue 9:00AM - 10:00AM	Science Theatre Science Theatre
Workshops	Tue 10:00AM -12:00PM Tue 12:00PM - 14:00PM Tue 14:00PM - 16:00PM Wed 9:00AM - 11:00AM Wed 1:00AM - 13:00PM	Mat130, CivEng 102, CivEng G8 CivEng 102, CivEng G8 **Workshop time and location as per your workshop enrolment**
Laboratory class	**Week 9 & 10** Wednesday, Thursday & Friday: Various times	Valentine Annex (Hydraulics Laboratory) Your lab group and scheduled week/time to attend the laboratory will be arranged during Week 1
Course Coordinator and Lecturer (weeks 7-13)	Dr Stefan Felder email: s.felder@unsw.edu.au office: Room CE303 Civil and Environmental Engineering Building, Kensington phone: 807 19861 Water Research Laboratory, 110 King Street, Manly Vale	
Lecturer (weeks 1-6)	Dr Bruce Cathers email: b.cathers@unsw.edu.au office: Room CE304 Civil and Environmental Engineering Building, Kensington phone: 807 19825 Water Research Laboratory, 110 King Street, Manly Vale	
Teaching Fellow	Dr Xavier Barthelemy office: Room CE304 Civil and Environmental Engineering Building, Kensington phone: 807 19852 Water Research Laboratory, 110 King Street, Manly Vale	

Course Communications

If you have questions on any aspect of the course, you should post them to the discussion board on Moodle. The lecturers and teaching fellow for the course will only answer general course questions on Moodle (and not via email) so that everyone can see the answers. Before you post a new topic or question in the forum, please check if other students had a similar question before and check if the answer to your question is not provided in the course profile.

Distribution of Lecture Notes

The Lecture Notes for the semester are available from the University Bookshop. Full versions of the notes will be made available on the Moodle page of the course together with the lecture recording, lecture slides, etc.

Laboratory Groups

There is no Workshop in Week 1. **Week 1 activities**, other than lectures are administrative and **should be completed by 5pm Thursday 3rd March 2016**:

- The lab timetable and the enrolment sheet are on Moodle **-** a link for each is provided within Moodle.
- Form laboratory groups of five members. You have to self-select your laboratory groups (bearing in mind your individual timetables).
- To enrol, go to Moodle and in the CVEN2501 course, follow the link under the topic "Lab Groups" (the timetable is the link named 'Lab Timetable 2016.pdf'). After checking your availability with the timetable, just follow the sign-up link and click on the enrol button of your chosen group. **Remember, enrolment in the group is definitive** and cannot be changed afterwards.
- Please fill the groups to a total of 5 members. Students who fail to enrol by the Thursday of Week 1 (3rd March) will be automatically assigned to a group.
- Any groups with less than 5 members will be made up to 5 members before the labs commence. The final schedule will be available on Moodle. **No reminder email will be sent before the lab.**
- Note that there is a laboratory preparation assignment which carries marks towards your final grade and is due on arrival for your laboratory session.
- **A laboratory report** must be completed by your group and **submitted at the latest 2 weeks after your laboratory class.** The laboratory report counts towards your final course mark.

INFORMATION ABOUT THE COURSE

Principles of Water Engineering is the pivotal fluids course that you will take in your undergraduate programme since it covers the fundamentals that you will need for an understanding of fluid dynamics and hydraulics which are applied in several courses in the later years of your programme.

The main course taken **before** Principles of Water Engineering (CVEN2501) which supports its content is:

- **Engineering Mechanics (CVEN1300)**: the fundamental principles of hydrostatics are introduced and provide the foundation for understanding hydrostatic pressure, the buoyancy force and stability of floating bodies. In Principles of Water Engineering, these concepts are further developed when you learn to quantify the hydrostatic forces on plane surfaces, curved surfaces and bodies, and the principle upon which manometry is based and is used to measure fluid flows.

Courses to be taken **after** Principles of Water Engineering (CVEN2501) which are supported by its content are:

- **Water and Wastewater Engineering (CVEN3502)** in Semester 2: (civil and environmental engineering programmes): the design and operation of (i) water treatment plants, (ii) wastewater treatment plants, (iii) stormwater systems, (iv) water distribution systems and (v) sewage distribution systems require knowledge of free surface computations, head losses due to friction in pipes, local head losses due to pipe fittings and shear stresses at flow boundaries which maintain pipes and channels which are scoured clean.
- **Solid Wastes and Contaminant Transport (CVEN3702)** in Semester 2: (environmental engineering programme): quantifying the rate of pollutant transport, diffusion and dispersion in pipes, streams, rivers and estuaries requires knowledge of flow regimes (laminar and turbulent) and the velocity profiles in boundary layers.

HANDBOOK DESCRIPTION

See link to virtual handbook:

www.handbook.unsw.edu.au/undergraduate/courses/2016/CVEN2501.html

OBJECTIVES

The objectives of this course are to:

- Introduce you to the practice of water engineering.
- Introduce you to the theory of two quite different steady flows: closed conduit or pipe flow (i.e. pressurised flow) and briefly, to free surface flow (i.e. flows where the water surface is subject to atmospheric pressure).
- Give you an understanding of the properties of fluids, manometry, hydrostatics, the principles of mass and energy conservation, the forces and momentum in flowing fluids, flow in pipes, laminar and turbulent flow.
- Enable you to apply the fundamental principles of mass conservation, energy conservation and the momentum equation to the analysis of flows in different scenarios.
- Enable you to carry out a dimensional analysis and carry out the scaling for a physical model.
- Enable you to make estimates of boundary layer thickness and velocities over flat plates, and to estimate the forces on 2D and 3D bodies in submerged flows.
- Enable you to quantify pipe friction losses and to introduce you to some of the associated real life problems of pipe flow calculations.

HOW DO ASSESSMENT STRATEGIES ASSIST IN ACHIEVING THESE OBJECTIVES, AND HOW DO THESE OBJECTIVES CONTRIBUTE TO ACHIEVEMENT OF PROGRAMME OUTCOME ATTRIBUTES

Under normal circumstances, the final exam (value 60%), one online quiz (value 5%) in Week 8, one assignment due in Week 10 (value 15%) make up 80% of the assessment for this course. The remaining 20% is made up of Laboratory work (Preparation: individual with value 5% and 2 experimental group reports: value 7.5%+7.5%). (See section on Assessment for more details.)

Generally, the final exam, the quizzes, the assignment and the Laboratory work will be assessed against the following general criteria to encourage the achievement of the objectives:

- Understanding of the principles of fluid flow viz mass, energy and momentum principles.
- Ability to analyse and then apply the mass, energy and momentum principles to different fluid flow scenarios.
- Ability to take measurements in the Laboratory and process the results using relevant principles of fluid flow (Laboratory work only)
- Ability to make idealisations, based on Laboratory experimental setup in applying theory (Laboratory work only)
- Evidence of understanding of the principles of physical modelling (Site visit only).
- Ability to sketch total head line, hydraulic grade line and assess pipe condition using head loss calculations.

The course objectives, content and assessment focuses on encouraging the following attributes in you, with particular application to the hydraulics of pipe and open channel flows:

- The capacity for analytical and critical thinking and for creative problem solving: You will be exposed to, and be required to solve, numerous hydraulics problems in the Lectures, the Workshops and the assignments - “the learning is in the doing”. All these problems will cover a variety of scenarios, and where possible, will be drawn from engineering practice. You will be furnished with the solutions to all problems which will be made available to you on UNSW Moodle so that you are able to check your analyses.
- The skills for collaborative work: Laboratory work completed in small groups of students in a limited time period. The work is to be reported in written form.
- The skill for effective communication: Throughout this course, communication is the written variety. In your assignments, a portion of the mark may be allocated to the clarity of your solution methodology. This will be stated in the Assignment.

TEACHING STRATEGIES

Teaching in this course is centred on the Lectures which are technical in content. You will develop your analytical skills in hydraulics and fluid flows by applying the theory to problems which you undertake in the Workshops. The material in the Lectures is also reinforced and applied in the Laboratory work where you will also gain an appreciation of the idealisations made in applying the theory to various flow scenarios.

Purchase of the textbook is advised, as it contains the technical reference material for this course. The lectures and lecture notes are provided to highlight and summarise the key technical content of the textbook. Detailed lecture notes will be supplied in this course. The purpose is to free up your time to think and comprehend during the lectures.

A site visit to the UNSW Water Research Laboratory and the Manly Hydraulics Laboratory, both at Manly Vale, will provide you with insight into the contemporary use of physical models and dimensionless numbers for solving real and current engineering problems.

Private Study	• Review lecture material and reference books. • Identify questions which you need answered in the next workshop. • Reflect and work on the set workshop problems at the end of each lecture. • Reflect on and complete any assignments issued. • Reflect on class problems. • Check your email regularly. • Join Moodle discussions of problems • Download materials from Moodle • Keep up with notices and find out marks via Moodle
Lectures	• A complete set of Lecture notes will be made available to you through the UNSW Bookshop and Moodle. • Complete the solutions to any questions appearing in the question boxes in the lecture notes. • Consider and actively answer any questions posed during the course of the lecture and in the lecture notes – if not aloud, then in your head. • Find out what you must learn. • Follow worked examples or clarifications made during classes. • Be alert to any course announcements.
Workshops	• **Much of your learning will take place during the workshops.** If you work actively in this time, it will free you up for other activities outside of class. • Start solving the problems provided during the lectures. • Be guided by demonstrators. • Make sure you understand the solution strategies of any Worked Problems completed by your demonstrators. • Use your time to ask your demonstrators about any unresolved workshop or conceptual problems – even if your question relates to matters from previous weeks. Ask questions.
Assessments (quiz, examinations, assignments)	• Demonstrate your knowledge and skills • Demonstrate higher understanding and problem solving
Laboratory Work	• Use your time in the laboratory well so that you have an appreciation of (i) how real fluids flow, (ii) how to make fluid measurements, (iii) how the results of any measurements will inevitably differ from the theory and (iii) the reasons why the measured results differ from the theoretical values. • Hands-on work to set studies into context.
UNSW Moodle course page	• Solutions to the Workshop Problems will be made accessible to you on UNSW Moodle 2 days after the workshop. • From time to time, other information which will assist you in this course will be made available to you in UNSW Moodle. This will include: lecture notes, common errors from past exams and details of the final exam conditions, including the data section at the front of the paper.

	• The Moodle discussion forum will be the place of discussion regarding the course including any questions you may have, course announcements and other aspects of communication.
Email	• From time to time, messages will be sent to you concerning this course via the Moodle discussion forum. • Please note: it is a University requirement that you **check your UNSW emails regularly**. We recommend that they be checked **daily**. You will need to continually clear your emails to ensure that your email allocation is not exceeded – otherwise you will not be receiving emails that we send out to you.
Library	• Some past exam papers, but no worked solutions can be found online under MyCourse in the Library home page. • References which may be useful to you for this course can be found in the UNSW Library. See the Resources Section in this Course Profile.

EXPECTED LEARNING OUTCOMES

At the end of this course, you will be familiar with the engineering techniques used to analyse and design the basic components of urban drainage, water supply and wastewater systems:

- Upon successful completion of Principles of Water Engineering (CVEN2501) you will be able to:
- Explain the basic properties of fluids and how these relate to fluid flow.
- Explain the fundamental principles of fluid flow in pipes and free surface flows viz continuity, momentum and energy, and know to what situations they can be applied.
- Assess energy losses in pipes due to friction and various pipe fittings.
- Explain and describe the conditions for flows in pipes under which various flow regimes will occur: (i) laminar and turbulent flows, (ii) turbulent flows which are hydraulically rough or hydraulically smooth.
- Carry out computations of flows through pipes. This includes being able to identify the data requirements to support such computations.
- Undertake a dimensional analysis and make estimates of drag force and carry out computations related to boundary layers.
- Explain the connection between dimensional analysis and physical model testing.

ASSESSMENT

The Final Mark for this course will **normally** be based on the sum of the scores from each of the assessment tasks as follows:

Component	**Value (%)**	**Lab report and assignment due dates, Time and Other Comments**
Laboratory Preparation Assignment Labs held in Weeks 9 and 10. You will be advised of schedule after you enrolled before 5pm Thursday 3rd March (Week 1).	5% (individual work)	Due on arrival to your laboratory session and consists of: 1. Completed OH&S form OHS009 2. Completed Venturi experiment worksheets 3. Completed Pipe Flow experiment worksheets Note: The completion of assessments 1, 2 and 3 is marked for completeness at the beginning. It is to ensure that you are adequately prepared to undertake your experiments. All sheets must be completed to be awarded full marks.
Venturi experiment laboratory report	7.5% (group work)	Due 5pm Friday, 2 weeks after completion of experiment. Submit both your group's Venturi Lab report and your

Labs held in Weeks 9 and 10, i.e. if your lab is in Week 9 you have to submit your reports by Friday Week 11. Allow 45 minutes for this experiment.		Pipe Flow Lab report to the appropriately labelled wooden box "CVEN2501" on the 3rd floor of the CE Building. All marked Lab reports will be returned to you during the field trip when all groups have completed their experiments.
Pipe Flow experiment laboratory report Labs held in Weeks 9 and 10, i.e. if your lab is in Week 9 you have to submit your reports by Friday Week 11. Allow 45 minutes for this experiment.	7.5% (group work)	Submit with the Venturi experiment laboratory report
Online Quiz on Moodle page in **Week 8** Quiz content: Workshops and Lectures content up to and including Momentum 1 & 2	5% (individual work on Moodle course page)	Quiz to be completed on your Moodle page of the course. The online quiz will be available between <u>Thursday 28th April 8 am and Friday 29th April 8 am for 24 hour duration</u>. - A time limit of 8 hours has been set for this Quiz from the time you start your attempt (e.g. start at 10 am and attempt will end at 6 pm). - You are allowed 1 attempt - with an 8 hour time limit for this attempt within the given time frame (i.e. if you start your attempt at 2 am, your attempt will automatically end at 8 am with the end of the Quiz time frame). - You can review and change your answers before submitting your attempt. The quiz will comprise 10 randomly allocated multiple choice and/or numerical questions testing your understanding of the course theory. You will need a calculator.
Assignment: Pipe Flow Assignment due in Week 10	15% (individual work)	<u>5pm Friday 13th May (Week 10)</u> in appropriately labelled wooden box "CVEN2501" on the 3rd floor of CE Building. It is planned to return your marked assignment in the Week 13 Workshop.
Final Examination (2hrs)	60% (individual work, closed book)	Final exam will be held in the formal exam period. Data section at front of paper (with given equations, data values for some fluid properties and several graphs) will be made available to you in UNSW Moodle. This will include the exam conditions (e.g. number of questions, duration and permitted calculators). Note that there will be short questions concerning the guest lecture and the site visit, in the final examination.

FINAL EXAM

The Final Exam is worth 60% of your Final Mark if class work is included and 100% if your class work is not included.

For your class work mark (for two Labs, one online Quiz and one Assignment) **to be included, you must attain a mark of at least 40% in your Final Exam** (out of 100). If your exam mark is less than 40%, your course mark will become the exam mark.

If your pure exam mark (%) is higher than your compounded mark (consisting of marks for your final exam, online quiz, assignment and laboratory work), the highest of these 2 marks will be adopted as your Final Mark for this course,

provided you have satisfactorily completed the other course requirements i.e. Quiz, Laboratory work and the Assignment.

COURSE PROGRAM

The course schedule tabulated below shows the main topics and approximately how long will be spent on each topic in lectures. Please note that the lecture durations and sequence of topics is a guide only; there may be some variations. However, details on the associated assessment tasks should not be affected; if they are you will be informed.

SEMESTER 1, 2016

Week Lecturer	**Week Commencing**	**Lecture and Workshop Topics Mondays (2hrs) & Tuesdays (1hr)**	**Recommended Text Chapters** (approx.)	**Assessment and Other Notes**
1 BC	29 Feb.	Introduction to Course (0.25hr), Fluid Properties (1.75hrs), Hydrostatics (1hr) No Workshops in Week 1	1.8, 1.9, 2.1-2.4	Enrol in a lab group using the sign-up sheet in Moodle. All lab groups will contain 5 members. Enrol before 5pm Thursday 3rd March 2016.
2 BC	07 March	Hydrostatics (1hrs)+Continuity 1 (1hr), Continuity 1 (1hr) Workshop: Fluid properties (2hrs)	2.5-2.8, 4.1	
3 BC	14 March	Continuity 2 (2hr)+Energy 1 (1hr) Workshop: Hydrostatics	3.1, 3.3, 3.6	
4 BC	21 March	Energy 1 (1hr)+Energy 2 (1hr), Energy 2 (1hr) Workshop: Continuity 1 & 2	3.6-3.7	
	28 March	Recess week – no lectures and no workshops		
5 BC	4 April	Energy 3 (2hrs), Momentum 1 (1hr) Workshop: Energy 1 & 2 (2hr)	3.6-3.7, 3.4	
6 BC	11 April	Momentum 1 (1hr) + Momentum 2 (1hr), Momentum 2 (1hr) Workshop: Energy 3 & Momentum 1	3.4	
7 SF	18 April	Pipe flow (2hrs), Pipe flow (1hr) Workshop: Momentum 1 & 2	6.1-6.8	
8 SF	25 April	Monday no lectures **(public holiday);** Tuesday lecture: Pipe flow (1hr) Workshop: Pipe flow	6.1-6.8, 1.6, 5.1-5.3	**Online Quiz** on Moodle course page (5% individual) Complete an online quiz between Thursday 8 am and Friday 8 am. You have one attempt. **Assignment** on Pipe Flow (15% individual) issued.

9 SF	02 May	Dimensional analysis (2hrs), Dimensional analysis (1hr) Workshop: Dimensional analysis		**Laboratory classes** on Wednesday, Thursday and Friday (as per enrolment in Week 1)
10 SF	09 May	Dimensional analysis (1hr), Physical models 1 (1hr), Guest lecture (Dr Francois Flocard) (1hr) Workshop: Dimensional analysis and Physical models 1	1.6, 5.1-5.3	**Laboratory classes** on Wednesday, Thursday and Friday (as per enrolment in Week 1) **Assignment** (15% individual) **due by 4pm Friday 13h May 2016**.
11 SF	16 May	Physical models 1 + 2 (1hr + 1hr), Physical Models 2 (1hr) Workshop: Physical models 1 and 2	5.1-5.3, 5.5	
12 SF	23 May	Boundary layers (2hrs), Boundary layers (1hr) Workshop: Boundary layers	7.1-7.5	Friday 27th May - Manly Vale site visit to Water Research Laboratory (UNSW) and Manly Hydraulics Laboratory (Public Works). Starting from 8am allow 1hr bus trip, 1hr on site and 1hr return bus trip: bus pick-up point at bus stop on High Street, Gate 9 - upper campus (map reference B25). You will be notified of the exact arrangements via Moodle and email.
13 SF	30 May	Drag Force (2hrs), Revision lecture (1hr) Workshop: Drag Force	7.6	

DETAILED INFORMATION FOR THE LABORATORY AND WEEK 12 VISIT TO MANLY VALE LABORATORIES

1) Laboratory Work: The laboratory work is a **compulsory component** of this course. Your attendance and participation in all laboratory work is a requirement for passing the course. Failure to complete or participate in this component will result in a grade of Unsatisfactory Fail (UF) for this course. Your laboratory demonstrator will be keeping a record of attendance at the laboratory work via your submission of your individual Laboratory Preparation Assignment and form OHS009 (available on Moodle).

It is compulsory that you adhere to any OH&S requirements or instructions from your laboratory demonstrator or course coordinators, during or before you participate in the laboratory experiments. Closed footwear is an OH&S requirement for entry to University Laboratories.

Only one report per group is required per experiment. You must use the supplied cover sheet at the front of your report and this must include: (i) names and signatures of those members in your group **who participated**, (ii) your group number, (iii) name of the experiment, (iv) the date when your group undertook the experiment, and (v) a statement of the proportional contribution of each group member (as a percentage).

The laboratory work is to be completed in groups of 5. Your group will complete two experiments during a single laboratory session – the time allowed for completing each experiment is 45 minutes (i.e. 1.5 hours for completing both experiments). **The laboratory sessions will be scheduled separately from your Lecture and Workshop times**. The Laboratory work will be undertaken in Weeks 9 and 10 on Wednesday, Thursday or Friday in various time slots as per

Moodle course page.

If you do not attend your scheduled Laboratory session, a penalty of 20% (of full marks for the missed Labs) will be imposed and you will be required to attend at a later date. This is necessary to ensure that the laboratory component for all of you is completed within the semester and to avoid disruptions and re-scheduling of lab work. If for some reason of illness or misadventure, you miss your scheduled laboratory session, you must submit a Special Consideration to the Course Coordinator within 3 working days. Depending on the Special Consideration, the penalty on the laboratory work may or may not be applied.

Your marked laboratory reports can only be returned to you during the field trip when all groups have completed their laboratory work. Laboratory notes are available in Moodle.

Exemption from Laboratory Work: Please note that only if you are repeating this course, an exemption from the Labs will be given if you comply with both of the following:

- You must notify Dr. Felder (s.felder@unsw.edu.au) by email of (i) your name, (ii) student ID (iii) marks for both labs and (iv) the year in which you previously undertook CVEN2501 by 4pm Thursday, 3rd March 2016.
- Your combined lab marks for both experiments must have been equal to or in excess of 60% for the two Laboratory Reports.

No other exemptions for other parts of the course (such as Hand-ins or the Assignment) will be granted.

Where is the Kensington Hydraulics Laboratory and how do you get to it? The Kensington Hydraulics Laboratory is under the Valentine Annexe (map reference H22) next to the multi-storey car park. Access to the Laboratory is through the main front entrance of the Civil and Environmental Engineering Building, turn left and proceed eastwards to the end of the corridor past the ground floor lecture rooms, through 2 more doors (still walking in the same easterly direction towards the multi-storey car park), pass through the Concrete Laboratory and into the Hydraulics Laboratory where you will see various flumes.

2) Site Visit to the Manly Vale Laboratories: On the Friday of Week 12 (27th May), you will be taken on a site visit of the UNSW Water Research Laboratory (WRL) and the NSW Government Manly Hydraulics Laboratory (MHL), to view some physical models being used to solve real engineering problems.

Buses will be provided to take you to WRL and return to Kensington. Please note that **set-downs on the return journey are not permitted**. The laboratories are 22km by road from the Kensington campus. You can make your own way to and from WRL.

The capacity of each bus is about 57. Well before the site visit, you will be asked to nominate a particular bus with its departure (and return) times fixed, to allow the transport of the whole class to and from Manly Vale.

In scheduling the site visit for the day, we allow about 1hr travel time to the Laboratories from Kensington, 1hr total spent at the two Laboratories and 1hr to return to Kensington.

Note that the UNSW Water Research Laboratory is set back from King Street and does not have a street number. However, it is located next door to Manly Hydraulics Laboratory which is at 110 King Street, Manly Vale.

If you prefer to make your own way to the Laboratories, feel free to do so. Parking is available (i) on King Street and Sunshine Street near MHL, and (ii) in the WRL car park which is inside the WRL compound. To reach the WRL car park, you drive some 30m past the big blue-grey gates at the entrance to the Laboratory off King Street and turn right at the first opportunity into the car park. Note that the WRL entrance is located on a sharp bend in King Street, and care needs to be taken when turning off King Street into the WRL driveway. A local map and grounds diagram showing the labs and parking will be made available to you in Moodle.

OH&S form OHS009 (submitted during the laboratory session) is required to be completed before the visit by everyone attending. Also, it is an OH&S requirement that you wear closed footwear (i.e. no thongs or sandals) on this visit to the laboratories.

A separate notice will be made available in the Moodle Forum and will be emailed to you in Week 9 or 10, giving you more details of the visit i.e. upper and lower campus bus pick-up points, maps of destination (for those of you making

your own way).

The **assessment** associated with this visit will be some short questions in the Final Exam.

Late Submissions, Attendance Requirements, Laboratory Participation

Late submissions for laboratory reports and the assignment will attract a penalty of 10% (of full marks) per day (including Saturdays and Sundays).

Should you have any concerns or queries regarding your assessment you MUST submit your concerns in writing to the School office addressed to the course coordinator within 2 weeks of the date of concern, attaching the assessment item in question.

Special Considerations: There are 2 procedures for applying for Special Consideration due to illness or misadventure:

(i) Missed or affected assessment has a value <20%. You must furnish the full supporting documentation to the Course Coordinator within 3 working days of the illness or misadventure. The recommended way of lodging the documentation is with the 4th floor School Office, who will place it in the Coordinator's pigeonhole.

(ii) Missed or affected assessment has a value ≥20%. You must formally furnish the full supporting documentation to the UNSW Student Centre (map reference C22) within 3 working days of illness or misadventure. For the form to be completed, see: **https://my.unsw.edu.au/student/atoz/consideration.pdf**

RESOURCES

Textbook

White, F. M. (2011) Fluid Mechanics. 7th Edition, McGraw-Hill, ISBN 978 0 07 128645 9 [University Bookshop; UNSW Library, Level 8, 620.106/77 – 5 copies]

References

- Street, R.L., Watters, G. Z. and Vennard, J.K., Elementary Fluid Mechanics, John Wiley and Sons, New York, 1996, 7th edition, ISBN 0 471 01310 3. [UNSW Library, Level 6, P532/19 – 5 copies]
- Finnemore, E.J. and Franzini, J.B. (2002) Fluid Mechanics with Engineering Applications, McGraw-Hill, 2002, 10th Edition, ISBN 0 07 112196 X. [UNSW Library, Level 6, 532/28 - 5 copies]
- Munson, B.R., Young, D.F. and Okiishi, T.H., Fundamentals of Fluid Mechanics, John Wiley and Sons, New York, 2009, 6th edition, ISBN 978 0 470 26284 9. [UNSW Library, Level 8, 620.106/78 – 2 copies]
- Cengel, Y. A. and Cimbala, J. M., Fluid Mechanics: Fundamentals and Applications, McGraw-Hill, 2010, 2nd edition, SI version, ISBN 978 0 071 28421 9 [UNSW Library, Level 8, 620.106/73 – 5 copies]

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

https://my.unsw.edu.au/student/resources/KeyDates.html

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

https://student.unsw.edu.au/plagiarism

ACADEMIC ADVICE

(Formerly known as Common School Information)

For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations,
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Academic Advice on the School website available at:

http://www.engineering.unsw.edu.au/civil-engineering/resources/academic-advice