



The University of Southern Queensland

Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.
Please consult the web for updates that may occur during the year.

Description: Hydraulics II

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ENV	3104	86309	1, 2009	EXT	1.00	Toowoomba

Academic group:	FOENS
Academic org:	FOES03
Student contribution band:	2
ASCED code:	030999

STAFFING

Examiner: Rod Smith
Moderator: Joseph Foley

REQUISITES

Pre-requisite: ENV1101 or ENV2103 or Students must be enrolled in one of the following Programs: GCEN or GDET or METC or MEPR

SYNOPSIS

The emphasis of this course is the application of hydraulic theory to the solution of problems commonly encountered in engineering hydraulics and to the design of hydraulic systems and structures. The basic concepts of the conservation of mass, momentum and energy (introduced in Hydraulics I) are reviewed, extended and applied to a variety of hydraulic systems. New material on unsteady pipeline and open channel flows, loose boundary hydraulics and coastal hydraulics is presented and applied. Students are practised in the design and analysis of open channel, pipeline and pumping systems and a wide range of hydraulic structures.

OBJECTIVES

The course objectives define the student learning outcomes for a course. The assessment item(s) that may be used to assess student achievement of an objective are shown in parenthesis. On completion of this course, students should be able to:

1. evaluate and apply the equations available for the description of open channel and pipe flow (Assignment 1, Assignment 2, Exam);
2. solve problems involving compound and branching pipes (Exam);
3. solve simple pipe networks using an appropriate method (Assignment 2, Exam);
4. select a pump to meet a specified duty (Exam);
5. match a pump to a pipeline system and determine the operating point of the pump (Exam);
6. determine the maximum discharge and suction lift for cavitation free operation of a pump (Exam);
7. apply rigid and elastic water hammer theory to the analysis of pipeline systems (Assignment 2, Exam);

8. calculate the maximum allowable rates for valve open and closure (Exam);
9. design lined and erodible channels (including vegetative lined channels) (Exam);
10. solve the equations governing unsteady open channel flow and apply them to the solution of practical flow problems including: runoff on a plane surface, routing of a stream hydrograph, passage of a surge wave (Assignment 1, Exam);
11. predict the sediment load in an open channel or natural stream (Exam);
12. design a range of hydraulic structures including: fixed and movable crest weirs; gated control structures; pipe conveyance structures; spillways and energy dissipation structure; critical flow measuring flumes; gully control structures ; weir and culvert type structures using the minimum specific energy concept (Assignment 2, Exam).

TOPICS

Description	Weighting (%)
1. Pipeline and pumping systems, pipe networks	20.00
2. Unsteady flow in pipelines - water hammer and surge	20.00
3. Unsteady free surface flow	20.00
4. Loose boundary hydraulics, stable channel design	20.00
5. Hydraulic Structures	20.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

Any hand held battery operated calculator.

Chadwick, A, Morfett, J & Borthwick, M 2004, *Hydraulics in civil and environmental engineering*, 4th edn, E & FN Spon, London.

Nalluri, C & Featherstone, RE 2001, *Civil engineering hydraulics*, 4th edn, Blackwell Science, Oxford.

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Chow, VT 1959, *Open channel hydraulics*, McGraw Hill, New York.

Graf, WH 1971, *Hydraulics of sediment transport*, McGraw Hill, New York.

Kraatz, DB & Majahan, KI 1975, *Small hydraulic structures*, Food and Agriculture Organisation, Rome.

(26/1, 26/2)

Sharp, BB 1996, *Water hammer: practical solutions*, Edward Arnold, London.

Stephenson, D 1989, *Pipeline design for water engineers*, 3rd edn, Elsevier, New York.

Stephenson, D & Meadows, ME 1986, *Kinematic hydrology and modelling*, Elsevier, New York.

United States Bureau of Reclamation 1974, *Design of small canal structures*, US Dept of the Interior Bureau of Reclamation, Denver.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	30.00
Directed Study	86.00
Examinations	2.00
Private Study	37.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	150.00	15.00	01 May 2009
ASSIGNMENT 2	150.00	15.00	22 May 2009
2 HOUR RESTRICTED EXAMINATION	700.00	70.00	END S1 (see note 1)

NOTES

1. Student Administration will advise students of the dates of their examinations during the semester.

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- 2 Requirements for students to complete each assessment item satisfactorily:
To satisfactorily complete an assessment item a student must achieve at least 50% of the marks or a grade of at least C-. Students do not have to satisfactorily complete each assessment item to be awarded a passing grade in this course. Refer to Statement 4 below for the requirements to receive a passing grade in this course.
- 3 Penalties for late submission of required work:
If students submit assignments after the due date without extenuating circumstances then a penalty of 5% of the assigned mark may apply for each working day late up to a maximum of ten working days at which time a mark of zero can be recorded for that assignment.
- 4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade in a course a student must obtain at least 50% of the total weighted marks for the course.
- 5 Method used to combine assessment results to attain final grade:

The final grades for students will be assigned on the basis of the weighted aggregate of the marks (or grades) obtained for each of the summative assessment items in the course.

- 6 Examination information:
In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); any calculator (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination).
- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.
- 8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

ASSESSMENT NOTES

- 1 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.
- 2 Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.
- 3 In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.
- 4 The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media.
- 5 The Faculty will NOT accept submission of assignments by facsimile.
- 6 Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.
- 7 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.
- 8 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded one of the temporary grades: IM (Incomplete - Make up), IS (Incomplete - Supplementary Examination) or ISM (Incomplete -Supplementary Examination and Make up). A temporary grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.
- 9 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate

supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).

OTHER REQUIREMENTS

- 1 Students will require access to e-mail and internet access to USQConnect for this course.
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