Description: Hydraulics II

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
<th>Campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENV</td>
<td>3104</td>
<td>62386</td>
<td>1, 2007</td>
<td>ONC</td>
<td>1.00</td>
<td>Toowoomba</td>
</tr>
</tbody>
</table>

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

STAFFING
Examiner: Rod Smith

REQUISITES
Pre-requisite: ENV1101 or ENV2103

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; gulley control structures; weir and culvert type structures using the minimum specific energy concept (Assignment 2, Exam).

**TOPICS**

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

**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).

ENV3104 *Hydraulics II external study package*, USQ Publication,
Any hand held battery operated calculator.

**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.

FAO Irrigation and Drainage Paper *Small hydraulic structures*, (26/1, 26/2)


**STUDENT WORKLOAD REQUIREMENTS**

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>30.00</td>
</tr>
<tr>
<td>Directed Study</td>
<td>30.00</td>
</tr>
<tr>
<td>Examinations</td>
<td>3.00</td>
</tr>
<tr>
<td>Lectures</td>
<td>42.00</td>
</tr>
<tr>
<td>Private Study</td>
<td>36.00</td>
</tr>
<tr>
<td>Tutorials</td>
<td>14.00</td>
</tr>
</tbody>
</table>

**ASSESSMENT DETAILS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIGNMENT 1</td>
<td>150.00</td>
<td>15.00</td>
<td>04 May 2007</td>
</tr>
<tr>
<td>ASSIGNMENT 2</td>
<td>150.00</td>
<td>15.00</td>
<td>25 May 2007</td>
</tr>
<tr>
<td>3 HOUR RESTRICTED EXAMINATION</td>
<td>700.00</td>
<td>70.00</td>
<td>END S1 (see note 1)</td>
</tr>
</tbody>
</table>

**NOTES**

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

**IMPORTANT ASSESSMENT INFORMATION**

1. **Attendance requirements:**
   - It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and 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 the course.

3. **Penalties for late submission of required work:**
   - If students submit assignments after the due date without prior approval then a penalty of 20% of the total marks available for the assignment will apply for each working day late.

4. **Requirements for student to be awarded a passing grade in the course:**
   - To be assured of receiving a passing grade a student must achieve at least 30% in each of the weighted assessment items, achieve at least 50% in the examination and at least 50% of the total weighted marks available 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.