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>
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<tr>
<td>ENV</td>
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<td>10576</td>
<td>1, 2002</td>
<td>EXT</td>
<td>1.00</td>
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Academic Group: FOENS
Academic Org: FOES03
HECS Band: 2
ASCED Code: 030999

STAFFING
Examiner: Rod Smith
Moderator: Mark Porter

PRE-REQUISITES
Pre-requisite: ENV 2103 or ENV 1101

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
Upon successful completion of this course the student should be able to:

- evaluate and apply the equations available for the description of open channel and pipe flow;
- solve problems involving compound and branching pipes;
- solve simple pipe networks using an appropriate method;
- select a pump to meet a specified duty;
- match a pump to a pipeline system and determine the operating point of the pump;
- determine the maximum discharge and suction lift for cavitation free operation of a pump;
- apply rigid and elastic water hammer theory to the analysis of pipeline systems;
- calculate the maximum allowable rates for valve open and closure;
- design lined and erodible channels (including vegetative lined channels);
- 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;
- predict the sediment load in an open channel or natural stream;
- 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.

**TOPICS**

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

Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at http://bookshop.usq.edu.au by entering the author or title of the text.

A hand held battery operated calculator which does not have keys for the alphabet.


**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.


STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>Assessment</td>
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<td>Directed Study</td>
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<td>Examinations</td>
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<td>Private Study</td>
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ASSESSMENT DETAILS

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks Out of</th>
<th>Wtg(%)</th>
<th>Required</th>
<th>Due Date</th>
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<tr>
<td>ASSIGNMENT 1</td>
<td>150.00</td>
<td>15.00</td>
<td>Y</td>
<td>04 Mar 2002</td>
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<td>(see note 1)</td>
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<tr>
<td>ASSIGNMENT 2</td>
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<td>04 Mar 2002</td>
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<td>(see note 2)</td>
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<tr>
<td>3 HOUR RESTRICTED EXAMINATION</td>
<td>700.00</td>
<td>70.00</td>
<td>Y</td>
<td>END S1</td>
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<td>(see note 3)</td>
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NOTES:
1. Further details about the due dates are detailed in the assessment section of the Course Specifications.
2. Further details about the due dates are detailed in the assessment section of the Course Specifications.
3. Further details about the due dates are detailed in the assessment section of the Course Specifications.

OTHER REQUIREMENTS

1. Students should achieve at least 45% of the maximum possible marks in each assignment, at least 50% of the marks in the final examination, and at least 50% of the aggregate marks for all assessments in order to complete the course successfully.
2. The final examination in this course is restricted. Only the following item may be brought into the examination by the student - a hand held battery operated calculator which does not have keys for the alphabet.
3. Students must note the make and model of the calculator used on the front of the Answer Book or Examination Paper where applicable. This may be subject to checking by the supervisor.
4. The due date for an assignment is the date by which a student must submit the assignment to the USQ. The onus is on the student to provide proof of the submit date, if requested by the Examiner.
5. Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.
6 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.

7 If students submit assignments after the due date without prior approval then a penalty of up to 20% of the total marks for the assignment will apply for each working day late.

8 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.

9 The Faculty of Engineering and Surveying will NOT accept submission of hand written or typed assignments by facsimile, e-mail or computer diskette. Students in remote locations who do not have regular access to postal services may be given special consideration.

10 A minimum standard of communication skills must be demonstrated in order for a passing grade to be achieved.

11 The Faculty of Engineering and Surveying does not offer supplementary examinations.

12 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 the temporary grade: IM (Incomplete - Make up). An IM 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.

13 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; IDSM (Incomplete Deferred Examination and Make-up).