



## 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: Hydrology

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ENV	3105	90317	2, 2009	ONC	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES03
<b>Student contribution band:</b>	6
<b>ASCED code:</b>	010711

#### STAFFING

Examiner: Ian Brodie  
Moderator: Rod Smith

#### REQUISITES

Pre-requisite: ENG2102 or Students must be enrolled in one of the following Programs: GCEN or GDET or METC or MEPR

#### SYNOPSIS

Hydrologic analysis provides the input parameters essential for the design of many engineering works, from the simplest road culvert to major water storage reservoirs. It also may provide data upon which the managers of our water resource can base their decisions. A knowledge of engineering hydrology is essential for the specialist water engineer and for many engineers employed in essentially non water engineering positions. For example, local government authorities and state main roads departments spend hundreds of millions of dollars annually on small water conveyance and drainage structures. Engineers employed by these authorities are required to determine the design capacity of these structures by estimating the runoff from the catchments draining to them. This course will familiarise students with a range of important surface and groundwater hydrological processes. Rainfall input and evaporation are considered from a treatment of elementary meteorology and Australian climatology. Some of the simpler solutions to common problems in engineering hydrology will be presented, along with the shortcomings of these solutions. The course will stress the stochastic nature of many hydrological processes and present some of the probabilistic approaches used. The course is presented using multimedia technology and students must have access to a computer with a CD drive in order to access the study materials. The package is available in some USQ computer laboratories.

#### 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. identify and describe the important physical processes in hydrology; (Assignment; 2 Hour Closed Examination Part A; 2 Hour Open Examination Part B)
2. explain the major processes of cloud formation and precipitation generation in the lower atmosphere; (2 Hour Closed Examination Part A)
3. interpret meteorological information and charts; (2 Hour Closed Examination Part A)
4. categorise the factors influencing climate and the climate classification for most major regions of Australia; (2 Hour Closed Examination Part A)
5. evaluate the available data and recognise problems relating to the lack of: homogeneity; stationarity; independence; completeness; reliability and accuracy; (Assignment; 2 Hour Closed Examination Part A; 2 Hour Open Examination Part B)
6. select and apply appropriate techniques to solve common problems in engineering hydrology. In particular to be able to: develop the design storm for a catchment; estimate the volume and peak rate of runoff from a catchment; prepare a simple frequency analysis; plot the low flow duration curve for a stream; estimate the capacity of a reservoir required to meet a specified yield; (Assignment; 2 Hour Open Examination Part B)
7. evaluate the reliability of engineering design estimates; (Assignment; 2 Hour Open Examination Part B)
8. identify the important parameters used in engineering analysis and design, and describe the standard methods of measurement for obtaining data; (Assignment; 2 Hour Open Examination Part B)
9. recognise the stochastic nature of many hydrologic processes and apply appropriate probabilistic techniques in their analysis. (Assignment; 2 Hour Open Examination Part B)

## TOPICS

	Description	Weighting (%)
1.	Hydrologic processes	10.00
2.	Hydrometeorology	15.00
3.	Climatology	7.00
4.	Hydrologic data	10.00
5.	Probability in hydrology	5.00
6.	Peak runoff from catchments; hydrographs	10.00
7.	Reservoir, stream and runoff routing	15.00
8.	Flood frequency analysis	10.00
9.	Reservoir capacity/yield analysis	10.00
10.	Rainfall intensity	8.00

## 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).

*ENV3105 Hydrology External Study Package*, USQ Publication,

Earplugs or headset for use in USQ computer laboratories.

Bureau of Meteorology 1992, *Manual of Meteorology, Part 1 - General Meteorology*, AGPS, Canberra.

Institution of Engineers Australia 1998, *Australian Rainfall and Runoff - A Guide to Flood Estimation*, Institution of Engineers, Australia, Vol 1.

(Available in either print or electronic book format)

## 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.

Peter Byrne Weather, Television Channel 9 - Win TV, 6:25 pm weekdays.

Chow, VT, Maidment, DR & Mays, LW 1988, *Applied Hydrology*, McGraw Hill, New York.

Institution of Engineers Australia 1998, *Australian Rainfall and Runoff - A guide to flood estimation*, Institution of Engineers, Australia, Vol 2.

McMahon, TA & Mein, RG 1978, *Reservoir Capacity and Yield*, Elsevier Developments in Water Science 9,

Todd, DK 1980, *Groundwater Hydrology*, 2nd edn, John Wiley and Sons,

Wilson, EM 1990, *Engineering Hydrology*, 4th edn, MacMillan,

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	35.00
Directed Study	60.00
Examinations	4.00
Lectures	13.00
Private Study	30.00
Tutorials	13.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT	200.00	20.00	09 Oct 2009
2 HR CLOSED EXAMINATION PART A	400.00	40.00	END S2 (see note 1)
2 HR OPEN EXAMINATION PART B	400.00	40.00	END S2

### 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 individual assessment item a student must achieve at least 50% of the marks or a grade of at least C-. (Depending upon the requirements in Statement 4 below, students may not have to satisfactorily complete each assessment item 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 an Open Examination, candidates may have access to any material during the examination except the following: electronic communication devices, bulky materials, devices requiring mains power and material likely to disturb other students. In a Closed Examination, candidates are allowed to bring only writing and drawing instruments into 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 despatched to USQ within 24 hours 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 must have access to a computer with a CDROM drive in order to study this course. All lecture and tutorial material is presented electronically on a CDROM.
  - 2 Students will require access to e-mail and internet access to UConnect for this course.
-