



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: Irrigation Science

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ENV	4106	90329	2, 2009	EXT	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES03
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	039999

### STAFFING

Examiner: Rod Smith  
Moderator: Steven Raine

### REQUISITES

Pre-requisite: AGR3304 or Students must be enrolled in one of the following Programs: GCEN or GDET or METC or MEPR

### SYNOPSIS

The control of the application of water to land (irrigation) and the removal of surplus water from land (drainage) is critical to much of Australia's agriculture. This course will provide the skills necessary for the design and management of effective, efficient and sustainable on farm irrigation systems. Irrigation application methods (current and proposed) are studied with an emphasis on the evaluation and optimisation of performance. Efficient irrigation also requires an appreciation of the physical processes of the entry, storage and redistribution of water in soils; the uptake of water by plants (including limitations caused by soil salinization); evaporation of water directly into the atmosphere; and evaporation through plants as transpiration (evapotranspiration). The course will also show students that the long term viability of irrigation is dependent upon the provision of adequate surface and subsurface drainage.

### 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 the factors limiting the performance of irrigated agriculture (in particular Australian irrigated agriculture) and urban irrigation and assess the technologies and management strategies available to address those limitations; (Portfolio; On-Line discussions)
2. describe quantitatively the occurrence and movement of water in soils, including the processes of infiltration, redistribution and drying, and the upward movement of water from a water-table; (Portfolio; On-Line discussions)

3. describe quantitatively the fundamental physics of atmospheric evapo-transpiration; and assess the relative magnitudes of the various factors controlling evaporation in any given agricultural or naturally-vegetated situation; (Irrigation scheduling, On-Line discussions)
4. determine the actual crop evaporation from standard daily Bureau of Meteorology station data using the 'FA056-Penman-Monteith' method; evaluate in comparison with standard evaporation pan data; and hence determine the water requirement of crops and prepare workable irrigation schedules; (Irrigation scheduling; On-line discussions)
5. analyse the characteristics of irrigation application methods (surface, sprinkler and micro-irrigation), evaluate system performance, and design systems for maximum performance; (Portfolio; On-line discussions)
6. apply the technologies and practices required to maintain sustainable irrigation, including the maintenance of acceptable salt balances in the root zone and the provision of adequate drainage; (Portfolio; On-line discussions)

## TOPICS

Description	Weighting (%)
1. Irrigation performance and evaluation;	15.00
2. Soil plant atmosphere continuum;	20.00
3. Micrometeorology and the physics of evaporation;	20.00
4. Irrigation scheduling	10.00
5. Irrigation application methods;	25.00
6. Drainage.	10.00

## 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).

## 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.

Allen, R. G., Pereira, L. S., Raes, D. and Smith, M. 1998, *Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements*,

(FAO Irrigation and Drainage Paper 56. <http://www.fao.org/docrep/x0490e00.htm>)

Campbell, G. S. 1985, *Soil Physics with Basic, Developments in Soil Science 14*, Elsevier,

Doorenbos, J. & Kassam 1979, *Yield Response to Water, FAO Irrigation and Drainage Paper No 33*, Rome.

Hillel, D. 1971, *Soil and Water - Physical Principles and Processes*, Academic Press, New York.

International Institute for Land Reclamation and Improvement 1979, *Drainage Principles and Applications*, 2nd edn, Wageningen, Vol 1-4.

Oke, J. R. 1988, *Boundary Layer Climates*, 2nd edn, Methuen, London.

Walker, W. R. & Skogerboe, G. V. 1987, *Surface Irrigation - Theory and Practice*, Prentice Hall,

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	35.00
Directed Study	50.00
Private Study	70.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ON-LINE DISCUSSIONS	180.00	18.00	20 Jul 2009 (see note 1)
PORTFOLIO 1	120.00	12.00	14 Aug 2009
IRRIGATION SCHED ASSIGNMENT	300.00	30.00	18 Sep 2009
PORTFOLIO 2	180.00	18.00	09 Oct 2009
PORTFOLIO 3	100.00	10.00	30 Oct 2009
LITERATURE RESEARCH	120.00	12.00	30 Oct 2009

### NOTES

1. Further details about due dates for this assessment will be provided by the examiner via the Introductory Book for this course.

## 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 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:  
There is no examination in this course.
  - 7 Examination period when Deferred/Supplementary examinations will be held:  
There will be no Deferred or Supplementary examinations in 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 will require access to e-mail and internet access to UConnect for this course.
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