



The University of Southern Queensland

Course Specification

Description: Numerical Methods for Partial Differential Equations

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
MAT	4103	20370	1, 2003	ONC	1.00	TWMBA

Academic Group:	FOSCI
Academic Org:	FOS003
HECS Band:	2
ASCED Code:	010101

STAFFING

Examiner: Chris Harman
Moderator: Sergey Suslov

PRE-REQUISITES

Pre-requisite: MAT3102

RATIONALE

In modelling many physical processes such as fluid transfer, transport phenomena in fluids and solids the resulting partial differential equations are not usually amenable to direct analytic solution. Consequently numerical methods are of central importance in finding solutions.

SYNOPSIS

This course introduces numerical techniques which are available for a wide range of partial differential equation models. Such models occur in a vast range of applications. Particular emphasis is on finite difference schemes, and smooth particle hydrodynamics applied to the description of heat transfer and transport phenomena in fluids and solids.

OBJECTIVES

Upon completion of this course, students will be able to:

- demonstrate the ability to set up partial differential equation models for a wide range of applications including heat transfer and transport phenomena in fluids and solids;
- solve the corresponding partial differential equations using computational numerical techniques;
- analyse the accuracy and stability of solutions of the partial differential equation models.

TOPICS

Description	Weighting (%)
1. Finite difference approximations	10.00
2. Convergence, consistency & stability	20.00
3. Solving the one-dimensional diffusion equation	10.00
4. Solving the one-dimensional advection equation	10.00
5. The one-dimensional transport equation	20.00
6. The transport equation in multi-dimensional space	20.00
7. Smooth particle hydrodynamics	10.00

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.

To Be Advised

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessment	47
Examinations	3
Private Study	97
Tutorial	26

ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
ASSIGNMENT 1	20.00	20.00	Y	04 Apr 2003
ASSIGNMENT 2	20.00	20.00	Y	06 Jun 2003
3 HOUR OPEN EXAMINATION	60.00	60.00	Y	END S1 (see note)

NOTES:

- . Examination dates will be available during the Semester. Please refer to Examination timetable when published.

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 complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available for each assessment item.
- 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 a passing grade, students must demonstrate, via the summative assessment items, that they have achieved the required minimum standards in relation to the objectives of the course by satisfactorily completing all summative assessment items (the examination and assignments).
- 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 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.
- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held in the fourth week of the semester following this course offering and the examiner will advise students involved in writing of the date time and location of any such examination.
- 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/SECARIAT/calendar/Part5/> or in the printed version of the current USQ Handbook.

ASSESSMENT NOTES

- 9 The examiner may grant an extension of the due date of an assignment in extenuating circumstances.