MONASH University
Information Technology

MAT2003
Continuous mathematics for computer science

Unit Guide

Semester 2, 2011

Last updated: 22 Aug 2011

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MAT2003 Continuous mathematics for computer science - Semester 2, 2011

Linear algebra: vectors and matrices, Matrix algebra with applications to flow problems and Markov chains; matrix inversion methods. Probability and combinatorics: elementary probability theory, random variables, probability distributions, expected value; counting arguments in combinatorics; statistics. Calculus: Differation and partial differentiation; constructing Taylor series expansions.

Mode of Delivery

- Clayton (Day)
- Sunway (Day)

Contact Hours

3 hrs lectures/wk, 1 hr laboratory/wk

Workload

Students will be expected to spend a total of 12 hours per week during semester on this unit as follows:

Lectures: 3 hours per week
Lab Sessions: 1 hour per week

and up to an additional 8 hours in some weeks for completing lab and project work, private study and revision.

Unit Relationships

Prohibitions

MAT1841

Chief Examiner

Dr Thomas Hall

Campus Lecturer

Clayton

Tom Hall

Contact hours: Tuesday 2:00 to 4:00

Sunway

Derek Holtby

Academic Overview

Learning Objectives

At the completion of this unit students will have:

- knowledge of linear algebra, elementary probability theory, statistics and elementary calculus;
- an understanding of the basics of linear algebra, the principles of probability and experimental design, counting principles in combinatorics, and the fundamentals of calculus;
- skills to do counting arguments with combinatorial objects, use Bayes' Theorem, manipulate matrices, differentiate functions of several variables and construct Taylor series for functions.

Graduate Attributes

Monash prepares its graduates to be:

1. responsible and effective global citizens who:

a. engage in an internationalised world
b. exhibit cross-cultural competence
c. demonstrate ethical values

critical and creative scholars who:

a. produce innovative solutions to problems
b. apply research skills to a range of challenges
c. communicate perceptively and effectively

Assessment Summary

Examination (3 hours): 70%; In-semester assessment: 30%

Assessment Task	Value	Due Date
Assignment 1	10%	Week 5
Assignment 2	10%	Week 8
Assignment 3	10%	Week 11
Examination 1	70%	To be advised

Teaching Approach

Lecture and tutorials or problem classes

This teaching and learning approach provides facilitated learning, practical exploration and peer learning

Feedback

Our feedback to You

Types of feedback you can expect to receive in this unit are:

- Graded assignments with comments
- Graded assignments without comments

Your feedback to Us

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through SETU, Student Evaluation of Teacher and Unit. The University's student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash's educational strategy, and on student evaluations, see:
http://www.monash.edu.au/about/monash-directions/directions.html
http://www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this unit

If you wish to view how previous students rated this unit, please go to
https://emuapps.monash.edu.au/unitevaluations/index.jsp

Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	COMBINATORICS Selections and arrangements, Pascal's Triangle	
2	Partitions, combinatorial identities, inclusion and exclusion, pigeonhole principle	
3	PROBABILITY Elementary theory, Bayesian analysis, random variables	
4	Mean and standard deviation, binomial distribution, normal distribution, t-distribution	
5	LINEAR ALGEBRA Systems of linear equations, Gaussian elimination	Assignment 1 due
6	Homogeneous systems, application to network flow, matrix algebra	
7	Application to Markov Chains	
8	Matrix inverses, determinants, application to coding	Assignment 2 due
9	CALCULUS Differentiation	
10	Parametric differation, higher derivatives, power series and Taylor polynomials	
11	Functons of several variables, partial differentiation	Assignment 3 due
12	Tangent planes and linear approximations, higher partial derivatives, Taylor polynomial of degree 2 (quadratic appoximation)	
	SWOT VAC	No formal assessment is undertaken SWOT VAC
	Examination period	LINK to Assessment Policy: http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html

*Unit Schedule details will be maintained and communicated to you via your MUSO (Blackboard or Moodle) learning system.

Assessment Requirements

Assessment Policy

To pass a unit which includes an examination as part of the assessment a student must obtain:

- 40% or more in the unit's examination, and
- 40% or more in the unit's total non-examination assessment, and
- an overall unit mark of 50% or more.

If a student does not achieve 40% or more in the unit examination or the unit non-examination total assessment, and the total mark for the unit is greater than 50% then a mark of no greater than 49-N will be recorded for the unit

Assessment Tasks

Participation

- **Assessment task 1**

  Title:
  Assignment 1
  Description:
  Answer questions on differentiation of functions, showing all working and clearly showing all steps
  Weighting:
  10%
  Criteria for assessment:

  - Assignments are judged on correctness of the answers and
  - Valid calculations and mathematical arguments to obtain those answers.

  Due date:
  Week 5

- **Assessment task 2**

  Title:
  Assignment 2
  Description:
  Answer questions on linear algebra, showing all working and clearly showing all steps.
  Weighting:
  10%
  Criteria for assessment:

  - Assignments are judged on correctness of the answers and
  - Valid calculations and mathematical arguments to obtain those answers.

  Due date:
  Week 8

- **Assessment task 3**

Title:
Assignment 3
Description:
Answer questions on differentiation of functions, showing all working and clearly showing all steps.
Weighting:
10%
Criteria for assessment:

- Assignments are judged on correctness of the answers and
- Valid calculations and mathematical arguments to obtain those answers.

Due date:
Week 11

Examinations

- **Examination 1**

Weighting:
70%
Length:
3 hours
Type (open/closed book):
Closed book
Electronic devices allowed in the exam:
No calculators or other electronic devices are allowed in the exam. Students will not be disadvantaged by not having a calculator. Where a calculation would be needed, the expression to be evaluated can be written and left without evaluation, and marks will not be reduced for no evaluation.

Assignment submission

It is a University requirement (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html) for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at http://www.infotech.monash.edu.au/resources/student/forms/. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an online quiz).

Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process: http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html.

Returning assignments

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later

Other Information

Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at: http://policy.monash.edu.au/policy-bank/academic/education/index.html

Key educational policies include:

- Plagiarism (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-policy.html)
- Assessment (http://www.policy.monash.edu/policy-bank/academic/education/assessment/assessment-in-coursework-po
- Special Consideration (http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.h
- Grading Scale (http://www.policy.monash.edu/policy-bank/academic/education/assessment/grading-scale-policy.html)
- Discipline: Student Policy (http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-discipline-policy.html)
- Academic Calendar and Semesters (http://www.monash.edu.au/students/key-dates/);
- Orientation and Transition (http://www.infotech.monash.edu.au/resources/student/orientation/); and
- Academic and Administrative Complaints and Grievances Policy (http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy.
- Codes of Practice for Teaching and Learning (http://www.policy.monash.edu.au/policy-bank/academic/education/conduct/suppdocs/code-of-practice-tea

Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at www.monash.edu.au/students The Monash University Library provides a range of services and resources that enable you to save time and be more effective in your learning and research. Go to http://www.lib.monash.edu.au or the library tab in my.monash portal for more information. Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis

- Website: http://adm.monash.edu/sss/equity-diversity/disability-liaison/index.html;
- Telephone: 03 9905 5704 to book an appointment with a DLO;
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus.