MAT2003
MAT2003: Continuous mathematics for computer science

Unit Guide

Semester 2, 2012

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

Last updated: 06 Jun 2012
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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

Consultation hours: Tuesday 2:00 to 4:00
Sunway

Lan Boon Leong

Consultation hours: Tuesday 2:00 to 4:00
Academic Overview

Outcomes

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

2. 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%

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>10%</td>
<td>Week 5</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>10%</td>
<td>Week 8</td>
</tr>
<tr>
<td>Assignment 3</td>
<td>10%</td>
<td>Week 11</td>
</tr>
<tr>
<td>Examination 1</td>
<td>70%</td>
<td>To be advised</td>
</tr>
</tbody>
</table>

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.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this unit

Previous feedback has shown satisfaction with this unit, and has not suggested improvements.

If you wish to view how previous students rated this unit, please go to
# Unit Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No formal assessment or activities are undertaken in week 0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>COMBINATORICS Selections and arrangements, Pascal's Triangle</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Partitions, combinatorial identities, inclusion and exclusion, pigeonhole principle</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PROBABILITY Elementary theory, Bayesian analysis, random variables</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mean and standard deviation, binomial distribution, normal distribution, t-distribution</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>LINEAR ALGEBRA Systems of linear equations, Gaussian elimination</td>
<td>Assignment 1 due</td>
</tr>
<tr>
<td>6</td>
<td>Homogeneous systems, application to network flow, matrix algebra</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Application to Markov Chains</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Matrix inverses, determinants, application to coding</td>
<td>Assignment 2 due</td>
</tr>
<tr>
<td>9</td>
<td>CALCULUS Differentiation</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Parametric differentiation, higher derivatives, power series and Taylor polynomials</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Functions of several variables, partial differentiation</td>
<td>Assignment 3 due</td>
</tr>
<tr>
<td>12</td>
<td>Tangent planes and linear approximations, higher partial derivatives, Taylor polynomial of degree 2 (quadratic approximation)</td>
<td>No formal assessment is undertaken</td>
</tr>
<tr>
<td>SWOT VAC</td>
<td></td>
<td>SWOT VAC</td>
</tr>
</tbody>
</table>

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

Assessment Policy

Faculty Policy - Unit Assessment Hurdles

Academic Integrity - Please see the Demystifying Citing and Referencing tutorial at http://lib.monash.edu/tutorials/citing/

Assessment Tasks

Participation

• Assessment task 1

  Title: Assignment 1
  Description: Answer questions on combinatorics, 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.
Assessment Requirements

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).

Online submission

If Electronic Submission has been approved for your unit, please submit your work via the VLE site for
this unit, which you can access via links in the my.monash portal.

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:
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)
- Special Consideration (http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.html)
- 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/)
- Codes of Practice for Teaching and Learning (http://www.policy.monash.edu/policy-bank/academic/education/conduct/suppdocs/code-of-practice-teaching-and-learning.html)

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. For Sunway see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/

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. At Sunway, visit the Library and Learning Commons at http://www.lib.monash.edu.my/. At South Africa visit http://www.lib.monash.ac.za/.

Academic support services may be available for students who have a disability or medical condition. Registration with the Disability Liaison Unit is required. Further information is available as follows:

- Website: http://monash.edu/equity-diversity/disability/index.html
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Sunway Campus
- Telephone: 03 9905 5704, or contact the Student Advisor, Student Community Services at 03 55146018 at Sunway