

MATH252-09B *Elements of Analysis*

Paper Outline

Lecturer

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Office Hours

Thursday 3.00 - 5.00pm in G3.22 during weeks 2-12.

Lectures

Monday	1.10 - 2.00 pm	K.G.01	(Lecture)
Wednesday	12.00 -12.50 pm	S.1.03	(Tutorial/Workshop)
Thursday	2.10 - 3.00 pm	S.1.03	(Lecture)

There will be approximately 24 lecture hours. Usually there will be a tutorial each week.

Paper description

This paper is designed to introduce students to the basic ideas of real analysis and some of its applications. This paper is worth 10 points.

The paper introduces basic topics of real analysis.

Objectives

- to understand the importance of limits, approximation and convergence. To know what it means for a sequence or series to converge, and for a function to have a limit
- to appreciate the topology of the real line (completeness and distance)
- to understand valid proofs and how to construct them.

Syllabus

- number systems; field, order and completeness axioms
- boundedness, sup and inf; asymptotics of monotone sequences
- convergence of sequences in \mathbb{R} ; sum, products and monotonicity of limits
- series in \mathbb{R} (including geometric and harmonic series); comparison test
- absolute and conditional convergence of series; ratio and root tests
- functions and continuous limits on \mathbb{R} ; continuous functions; intermediate value theorem; maximum value theorem.
- Rolle's, Mean Value and Taylor's theorems and their applications.
- Taylor series.
- The exponential, log, trig and binomial series. Radius of convergence.

Lecture Notes

These will be available on web-site: <http://www.math.waikato.ac.nz/~kab>.

Prescribed Text

Thomas' Calculus, 11th Edn by Finney, Weir and Giordano (Addison-Wesley-Longman).

Recommended Reading:

"A first course in mathematical analysis" by J.C. Burkill (CUP) alent, by Finney, Weir and Giordano (Addison-Wesley-Longman).

"Real Analysis, A First Course" by R.A. Gordon (Addison-Wesley).

Schedule

- **Assignment 1:** due Wednesday 22 July
- **Assignment 2:** due Friday 7 August
- **TEST 1:** **Wednesday 19 August - 12.00-12.50pm** in S.1.03 (class time)
- **Assignment 3:** due Friday 18 September
- **Assignment 4:** due Friday 5 October
- **TEST 2:** **Wednesday 7 October - 12.00-12.50pm** in S.1.03 (class time)

Assignments to be handed into the MATH252B slot under the Maths Office Reception counter G3.19.

Math Help

These sessions will be held **daily** from **1-2pm** in **G.B.19** during teaching weeks.

Assessment

The internal assessment:final examination ratio is 1:1 or 0:1, whichever works in your favour. The internal assessment will consist of **four** assignments each worth 10% of the internal component, and **two** tests each worth 30% of the internal component. Details of the final examination to be confirmed.

Note: An unrestricted pass will be awarded only to students who achieve both a final mark of at least 50% AND an examination mark of at least 40% AND attend at least 6 of the Tutorials/Workshops.

Missed items of assessment

If an item of internal assessment is missed due to medical circumstances or other good excuse, the following procedure should be followed: an application should be made to the lecturer for special consideration as soon as it is practicable to do so; the lecturer may require documentary evidence; if the application is for a missed assignment, an extension of time will usually be granted.

If the test is missed, and it is impractical to arrange an alternative test, a mark may be estimated based on the exam mark; otherwise an oral test may be given.

Noticeboards, handouts and return of assessed work

All notices about this paper will be posted on a noticeboard on the 3rd Floor of G Block near the Maths Lab (G3.12). Such notices are deemed to be official notifications. Material will also be posted on the paper web page, or:

<http://www.math.waikato.ac.nz/~kab>

Handouts will be given in class and posted on the WWW. Extra copies will be available from the shelves opposite the stairs on the third floor of G Block.

Normally marked items of internal assessment will be available from the lecturer (or in class) within two weeks of submission OR in the right-hand side of the pigeon holes around the corner from the lift.

TESTS scripts to be collected from the **School Receptionist (GG.19) - Ground Floor of G Block.**

Workload

Students should expect to work 6-7 hours per week, including attendance at lectures and tutorials.

Your attention is drawn to the following policies and regulations contained in the 2009 University Calendar.

Assessment Regulations 2006 (pg 127)
Student Discipline Regulations 2009 (pg 753)
Computer Systems Regulations 2006 (pg 773)
Policy on the Use of Māori for Assessment (pg 135)
Ethical Conduct in Human Research and Related Activities Regs 2008 (pg111)
Student Research Regulations 2009 (pg 109)
Student Complaints Policy 2004 (pg 769)

For further information please refer to: <http://www.math.waikato.ac.nz/studentinfo.html>