University of Manitoba
Faculty of Science
Department of Mathematics

1   Course Details

Course Title & Number	MATH 3472: Real Analysis 3
Number of Credit Hours	3
Class Times & Days of Week	MWF 12:30-1:20
Class Location	MH 315

2   Instructor Contact Information

Instructor(s) Name	Adam Clay
Office Location	473 Machray Hall
Office Hours or Availability	By appointment
Office Phone Number	204-474-6849
Email	adam.clay@umanitoba.ca
	Email is my preferred method of contact.

3   Textbook

Mathematical Analysis by Apostol, second edition. Suggested supplementary book: Elementary Classical Analysis by Marsden and Hoffman.

4   Course Outline

This course will cover multivariable calculus, the implicit function theorem, and Fourier series. Below is an approximate timetable for the course, subject to change as situations arise. The sections listed below are from Apostol.

Week of	Sections and topics	Comments
Jan 16	12.1, 12.2: Definition of the directional derivative and examples.	
Jan 22	12.3, 12.4, 12.5: Directional derivatives and continuity, the total derivative, a formula for total derivatives in terms of partials.	
Jan 29	12.6, 12.7, 12.8: An example concerning complex functions, quick linear algebra review and define Jacobians.	

Feb 5	12.9, 12.10, 12.11: Chain rule and Mean Value Theorem.	First assignment due Febraury 10 in class.
Feb 12	12.13, 12.14 : Sufficient conditions for differentiability and equality of mixed partials.	Test Feb 17.
Feb 26	12.14, 13.1, 13.2: Taylor's formula for multivariable functions, functions with nonzero Jacobian	
Mar 5	13.2, 13.3, 13.4: Inverse and implicit function theorems.	
Mar 12	1.1, 1.2, 1.3, 1.4: Orthogonal systems of functions, best approximations, definition of Fourier series.	Second assignment due March 17 in class.
Mar 19	11.5, 11.6, 11.7: Properties of Fourier coefficients and the Riesz-Fischer theorem.	Test March 24.
Mar 26	11.8, 11.9, 11.10: Riemann-Lebesgue Lemma, Dirichlet integrals.	
Apr 2	11.11, 11.12, 11.13: Riemann's localization theorem, Cesaro summability and Fejér's theorem.	
Apr 9	11.14, 11.15, 11.16: Consequences of Fejér's theorem, Weierstrass theorem.	
Apr 16	11.17, 11.18, 11.19: The Fourier integral theorem, possibly convolution.	
If time permits	11.20, 11.21, 11.22: Convolution in depth, Poisson summation.	

5   Course Evaluation Methods

Item	Due Date	Value of Final Grade
Assignments	Two assignments preliminary dates indicated above. Will confirm dates in class.	20%
Midterm tests	Two tests, preliminary dates indicated above. Will confirm dates in class.	40%
Final exam	Two hours, date to be determined.	40%

6 Grading

Letter Grade	Minimum percentage to guarantee	Final Grade Point
A+	90	4.5
A	80	4.0
B+	75	3.5
B	70	3.0
C+	65	2.5
C	60	2.0
D	50	1.0

7 Assignment Extension and Late Submission Policy

- Late assignments will receive the mark of zero.

- If you miss a test, you will be assigned a mark of zero unless acceptable reasons and supporting evidence are provided to your instructor no later than 48 hours after the test.

- If you miss one test for a valid reason, the values of the other term test and the final exam will be changed (increased by 10% each). If you miss both tests for a valid reason, you will be writing one make-up test covering the material of both regular term tests. As in the previous case, the one term test you write will have value 30% and the final exam will have value 50%.

8 Statement on academic dishonesty

The Department of Mathematics, the Faculty of Science and the University of Manitoba all regard acts of academic dishonesty in quizzes, tests, examinations or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personation. Students are advised to read section 7 (Academic Integrity) and section 4.2.8 (Examinations: Personations) in the General Academic Regulations and Requirements of the current Undergraduate Calendar. Note, in particular, that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (Student Discipline Bylaw) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

All students are advised to familiarize themselves with the Student Discipline Bylaw, which is printed in its entirety in the Student Guide, and is also available on-line or through the Office

of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web-page.