Math 4030U: Applied Functional Analysis

Winter 2011, T, 11:10am-12:30pm, UL1, R, 8:10am-9:30am, UL1

Instructor: Dr. C. Sean Bohun.
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Office Hours: Tuesday, 9:00-11:00.
Text: Applied Functional Anaylsis by Griffel, D.H.
Title: MATH 4030U Applied Functional Analysis (3), Section 001.
Description: This course introduces the student to the modern theory of infinite-dimensional spaces and its applications. The main topics revolve around Banach and Hilbert spaces and their applications to Fourier series, differential and integral equations. The course will focus on developing intuition and building a catalog of examples of infinite-dimensional spaces. Moreover, the course introduces the very important notions of Lebesgue measure and Lebesgue integrals. Applications will play a major role in motivating the theory.

Prerequisite: MATH 3020U, MATH 3060U.

Examination: In this section the term work consists of **1** midterm, **5** assignments and **1** final exam.

Midterm	Thursday, March 10	20%
Assignment 1	Tuesday, February 1	10%
Assignment 2	Thursday, February 17	10%
Assignment 3	Tuesday, March 15	10%
Assignment 4	Tuesday, March 29	10%
Assignment 5	Thursday, April 14	10%
Final	TBA	30%

If the student requires special arrangements to be made with the learning center, the learning center and the instructor must be notified at least one week prior to the exam date. The final exam will be cumulative.

Grading Policy: The final grades will be assigned as follows:

A+	90% - 100%	B−	70% - 72%
A	85% - 89%	C+	67% - 69%
A−	80% - 84%	C	60% - 66%
B+	77% - 79%	D	50% - 59%
B	73% - 76%	F	49% and below

Academic Honesty: Except for exams and tests, it is assumed that you can discuss problems and assignments among yourselves and with tutors and the professor, so long as what you turn in is your own work. In other words, the discussions are part of the learning process; once you learn how to approach a problem, you are expected to solve it yourself, write up your own submission, and that is what you turn in. It is dishonest to turn in as your own any work which has been copied from the work of someone else.
It is expected that each student enrolled at UOIT will become familiar with this policy and appreciate that academic dishonesty of any form will not be tolerated at UOIT. You are encouraged to carefully read the material in this section and to seek clarification from the appropriate Student Advisor if necessary. Acts of academic dishonesty include, but are not limited to:

CHEATING: Copying answers to exam/quiz questions from another student's exam/quiz paper; copying an out-of-class assignment from another person and submitting it as part of an academic assignment.

FACILITATING ACADEMIC DISHONESTY: Helping or attempting to help another to commit an act of academic dishonesty.

PLAGIARISM: Taking and passing off as one's own the ideas or words of another in any academic assignment.

A student charged with academic misconduct may face academic/or disciplinary sanctions. Read the University Policy on Academic Honesty which is located in Section 5.15 of the UOIT academic calendar `http://www.uoit.ca/calendar`

Term Work: The normal policy in the Faculty of Science for missed term work (tests and assignments) is to re-weight the remaining work to account for the missing grade. There are no make-up exams. If you miss a Science term test or major assignment due to illness or a death in the family you must obtain the appropriate documentation (UOIT Medical Certificate, death certificate), and submit it to the Science Student Advisor within 5 days of missing the test or assignment. If you cannot write a test for any other reason, you must discuss this with the Science Student Advisor and the instructor of the course at least 2 days before you are scheduled to write it. Exceptions to this rule include Varsity Athletics and test conflicts which have different deadlines. If you miss any exam for an invalid reason, you will receive zero for the exam.

IMPORTANT: It is possible that unforeseen circumstances may cause me to alter some of the information in this document. Any such alterations will be announced in class and followed up with a WebCT email message to the students of the class. If you miss any announcement because of inattention or absence from class, then you must accept the consequences of missing it.

COURSE SCHEDULE

Date	Material covered	Date	Material covered
January 11	1. Introduction	March 1	11. Operators and the Banach FPT
January 13	2. Introduction	March 3	12. Fund'al solns. and Green's fcns.
January 18	3. Normed vector spaces	March 8	13. Integral equations
January 20	4. Conv. in normed vector spaces	March 10	Midterm
January 25	No Class	March 15	14. Hilbert spaces
January 27	No Class	March 17	15. Fourier series
February 1	5. Basic Topology	March 22	16. Orthogonal expansions
February 3	6. Topology in normed vector spaces	March 24	17. Linear Functions
February 8	7. Completeness and Banach spaces	March 29	18. Weak convergence
February 10	8. The Lp-spaces	March 31	19. Eigenvalue problems
February 15	9. More on Lp-spaces	April 5	20. Compact operators
February 17	10. Operators and the Banach FPT	April 7	21. Spectral theorem
February 22	No Class	April 12	Leeway
February 24	No Class	April 14	Leeway