MATH 370 Section F10N01
Real Analysis
Sep – Dec 2010

VANCOUVER ISLAND UNIVERSITY

Time & Location: Tue & Thu 10:00-11:30 in Bldg 360 Rm 324

Instructor: Glen Pugh
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(250)753-3245 ext. 2752

Office Hours: Mon 10:00-11:30, Thu 11:30-1:00 & Fri 10:00-11:30, or by appointment

webpage: http://web.viu.ca/pughg/Spring2010/math370F10N01

This page will be updated regularly with announcements, handouts, homework assignments and solutions.

Prerequisite: Math 121/122 (or 100/101), Math 123, and at least 6 credits of courses numbered 200 or above (excluding Math 203 - Biometrics)

Text: *Basic Analysis – Introduction to Real Analysis* by Jiří Lebl

This text is available online (for free!) at

http://www.jirka.org/ra/realanal.pdf

I may supplement this text with material from the following books which will be placed on reserve at the library:

(i) *Real Analysis and Foundations* by Steven G. Krantz
(ii) *Principles of Mathematical Analysis* by Walter Rudin

Course Outline: This is a first course in Real Analysis. For this introductory treatment, you may think of Real Analysis as a behind-the-scenes look at calculus. When we write

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

what do we really mean? Intuitively, this says that as x gets close to zero, $\sin(x)/x$ gets close to 1, but that's rather vague; what do we mean by 'gets close to'? In Real Analysis we precisely define this notion of closeness and introduce the language and notation needed to prove results like the one above. These new tools allow us to rigorously prove much deeper results such as Taylor's Theorem and the Fundamental Theorem of Calculus. We'll also see how this (necessarily) formal theory has interesting and unexpected consequences which sometimes challenges our intuition. The sequence of topics is nicely presented in the seven chapters of the text:

0. Introduction and Set Theory
1. Real Numbers
2. Sequences and Series
3. Continuous Functions
4. The Derivative
5. The Riemann Integral
6. Sequences of Functions

As we progress through the material we will learn the important language, notation and proof techniques which are fundamental to many other fields (differential equations, complex variables, harmonic analysis, probability, etc.)

Homework: Six problem sets will be assigned throughout the term. Problem sets will consist of exercises from the text as well as a few from other sources. The homework assignments are worth 15% of your final grade.

Tests: We will have two 75 minute class tests given on the following **Thursdays: Oct 7** and **Nov 4.** Material for class tests will be drawn from your homework problems. Some of the main theorems covered in class may also be included. Prior to each test I will announced a set of 'test focus' problems and theorems. The better of your two tests is worth 25% of your final grade, the other worth 20%.

Final Exam: There will be a comprehensive final exam in December worth 40% of your grade. The exam period is Dec 9-20 2010. Travel plans should not be made until the final exam schedule is released, which is one month before exams begin. **In no event will the final exam be rescheduled to accommodate travel plans.**

Grading Summary:

Homework:	15%
Class Tests (2):	45%
Final Exam:	40%

Grading Scale:

90-100%	A+	76-79%	B+	64-67%	C+	50-54%	D
85-89%	A	72-75%	B	60-63%	C	0-49%	F
80-84%	A-	68-71%	B-	55-59%	C-		

Attendance: Attendance will not be taken, however you are encouraged to attend all lectures. If you miss class, read the textbook sections covered and borrow notes from a classmate. I do not lend my class notes.

Student email: Ensure that you have an active email address listed in your student record and that you check it regularly. I occasionally email the class with reminders or notices.