

Math 328 – Real Analysis **Spring 2015**

Class Meetings: PPHAC 335, MWF 1:10-2:20pm

Text: Elementary Real Analysis, 2nd Edition, Volume I, by Brian S. Thomson Judith B. Bruckner, Andrew M. Bruckner. Free downloadable PDF version is available at www.classicalanalysis.com.

Instructor: Fred Schultheis

Office Hours: MWF 9:00-10:00 and by appointment.

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From the beginnings of calculus in the 17th century with the works of Newton and Leibniz there was controversy about the very foundations of the subject. For example, many of the great mathematicians of the 18th century used the concept of an infinitesimal, a real number that is less than any positive real number and yet not zero. This made no sense and yet it worked. Then in 1807 a paper submitted by Joseph Fourier which provided a mathematical model for the movement of heat through a solid body also opened a proverbial can of worms regarding the foundations of calculus. It became clear that to formalize the calculus one first needed to fully understand the real numbers. This course will investigate how these problems in the foundations of calculus were finally resolved. After building a solid foundation for real numbers, we will explore the ideas of continuity, convergence, differentiability, infinite series, and other key ideas in analysis.

Goals and Objectives

- Expand on ability to solve problems in differential calculus
- Improve on the capacity to both prove results and solve problems
- Develop a base of examples illustrating important concepts and results of differential calculus
- Recognize the role of analysis in the development of modern mathematics
- Develop facility in reading and analyzing mathematical text
- Present clear solutions (not just answers) both written and orally.

Course Description

The course meets MWF 11:45-12:55 PPHAC 233. Homework assignments will be given at each class meeting. Students are expected to complete these assignments by the next class meeting, where they will be discussed. No one can learn mathematics without doing it themselves and so, to the student, homework is the most important part of the course. In addition to the daily homework assignments (ungraded) there will be regular problem sets (graded).

Grading

Your final grade will be based on; graded problem sets (about 200 points), 3 equally weighted hourly exams (100 points each), and a comprehensive final exam (at most one third of your total grade). **The final exam is scheduled for Monday May 4, 2015 at 8:30.** The following grading scale is used for assigning your final grade. You are responsible for all work covered in class and all assignments, even if absent from class. If you must miss more than one class due to illness or emergency, you should notify the instructor. **In-class exams must be taken at the announced time; make-up exams will be given only in case of extreme emergency or serious illness.**

		86 – 89	<i>B+</i>	76 – 79	<i>C+</i>	66 – 69	<i>D+</i>	≤ 59	<i>F</i>
93 – 100	<i>A</i>	83 – 85	<i>B</i>	73 – 75	<i>C</i>	63 – 65	<i>D</i>		
90 – 92	<i>A–</i>	80 – 82	<i>B–</i>	70 – 72	<i>C–</i>	60 – 62	<i>D–</i>		

Accommodations

Students who wish to request accommodations in this class for a disability should contact Ms. Elaine Mara, Assistant Director of Academic & Disability Support, located on the first floor of Monocacy Hall (extension 1401). Accommodations cannot be provided until authorization is received from the Academic & Disability Support office.

Extra Credit

One goal for this course is to develop an appreciation of the beauty and utility of mathematics. To help foster this appreciation you should spend some time outside of class thinking and discussing mathematics.

There are no specific requirements for this portion of the course but many opportunities for you to earn extra credit. Some examples of such activities include: attending talks, giving a talk, reading a paper, or solving a problem.

Some options for extra credit include, but are not limited to

- attending an epsilon talk
- attending a Mathematics Colloquium at Moravian
- attending a math talk at another LVAIC school
- attending the EPADEL conference in April
- • solving a problem outside the scope of the class (5-infinite points)

If you attend an event relevant to your mathematical growth, then to earn extra credit you need to write a short paper that explains what the event was and how it deepened your appreciation of differential equations or mathematics.

For any talks you attend a write up is due within one week of when the talk was given. No extra credit points will be accepted after the second last Friday (April 24, 2015) of the term.

ACADEMIC HONESTY POLICY GUIDELINES MATHEMATICS COURSES

The Mathematics and Computer Science Department supports and is governed by the Academic Honesty Policy of Moravian College as stated in the Moravian College Student Handbook (pp. 27-32). The following statements will help clarify the policies of members of the Mathematics faculty.

In all homework assignments which are to be graded, you may use your class notes and any books or library sources. When you use the ideas or thoughts of others, however, you must acknowledge the source. For graded homework assignments, you may not use a solution manual or the help, orally or in written form, of an individual other than your instructor. If you receive help from anyone other than your instructor or if you fail to reference your sources you will be violating the Academic Honesty Policy of Moravian College. For homework which is not to be graded, if you choose, you may work with your fellow students. You are responsible for understanding and being able to explain the solution of all assigned problems, both graded and ungraded.

All in-class or take-home tests and quizzes are to be completed by you alone without the aid of books, study sheets, or formula sheets unless specifically allowed by your instructor for a particular test.

Note: This syllabus is a guideline for the course. It may be necessary to make changes during the semester. I will announce any changes in class.