

# Mathematics 131

## Mathematical Analysis I

- Time and Place:** T & R 9:35 – 10:50 am, DAVD (Adams Hall). Spring 2013
- Instructor:** Asuman Guven Aksoy
- Office:** Adams 215, Campus x72769 Off-Campus: dial 607-2769
- Email:** [aaksoy@mckenna.edu](mailto:aaksoy@mckenna.edu);  
<http://www.asumanaksoy.com>
- Office Hours:** T & R 2:00 – 3:30 pm and by appointment.
- Text:** *Elementary Classical Analysis* (2<sup>nd</sup> edition) – J.E. Marsden, M. Hoffman  
*A Problem Book in Real Analysis*- A.G. Aksoy and M.A. Khamsi
- Prerequisites:** Math 60 Linear Algebra

### References:

The number of books on advanced calculus and introductory analysis is overwhelming. Despite the large number of recent texts, some of the older books remain the best. Some favorites are:

- Apostol, T.M., 1974. *Mathematical Analysis*, 2<sup>nd</sup> ed., Reading, Mass: Addison-Wesley.
- Bartle, R.G., 1976. *Elements of Real Analysis*, 2<sup>nd</sup> ed., New York: Wiley.
- Buck, R.C., 1965. *Advanced Calculus*, 2<sup>nd</sup> ed., New York: McGraw Hill
- Lang, S., 1968. *Analysis I*, Reading, Mass: Addison-Wesley.
- Rosenlicht, M., 1968. *Introduction to Analysis*, Glenview III: Scott, Foresman and Co.
- Rudin, W., 1976. *Principles of Mathematical Analysis*, 3<sup>rd</sup> ed., New York: McGraw Hill.
- Diedonne, J., 1966. *Foundations of Modern Analysis*, New Jersey: Prentice-Hall.
- Halmos, P.R., 1960. *Naïve Set Theory*, New York: Springer-Verlag.
- Simmons, G. f., *Introduction to Topology and Modern Analysis*, McGraw Hill, New York, 1963

### II. Some recent texts are:

- Wade, W.R., *Introduction to Analysis*, Prentice-Hall, NJ, 2000
- Abott, S., *Understanding Analysis*, Springer UTM, NY, 2001
- Pugh, C. *Real Mathematical Analysis*, UTM, NY, 2002

Davidson, K. R., Donsing A.P., *Real Analysis with Real Applications*, Prentice Hall, NJ, 2002

Beals, R., *Analysis: An Introduction*, Cambridge University Press, Cambridge, 2004.

### **Exams:**

- 2 Midterms Exams on February 26<sup>th</sup> and April 16<sup>th</sup>.
- 3-5 Quizzes, dates will be announced in class.
- Homework, Weekly, generally due on Thursdays

Comprehensive **Final Exam**, Thursday May 16<sup>th</sup> at 9:00 am

**There will be NO make-ups for any exams unless there is a very good reason.**

### **Grading Scheme:**

Final grade is computed as follows:

Homework: 20 %, Midterm I: 20 %, Midterm II: 20 %, Quizzes: 10%, Final Exam: 30%.

### **Class Participation and Homework:**

One of the goals of this course is that you learn the art of mathematical proofs. I expect frequent suggestions and questions during lectures. Homework will be assigned regularly and you may work with each other (unless otherwise is instructed) but **you must write up your own answers.**

### **Topics:**

1. Sets and functions
2. Countable sets and cardinality
3. Sequences, subsequences,  $\liminf$ ,  $\limsup$
4. Cauchy sequences, completeness
5. Metric and norms, metric spaces
6. The topology of the metric spaces
7. Compactness and connectedness
8. Continuity, uniform continuity
9. Sequences and series of functions, uniform convergence
10. Sets of measure zero, integration
11. Some fixed point theorems

### **Comments:**

This is a course in which the material you saw in Calculus is put on a solid mathematical basis. For some of you it will be the first course in which you are expected not to calculate answers, but to give proofs. The transition, though intellectually exciting, is difficult for many students. Students who think they will have particular difficulty with proofs are advised to work harder and meet with the professor and tutors during as early in the semester as possible.

**Tutoring:**

Tutoring will be held in the Math Commons Room on Sunday through Thursdays from 8:00-10:00 pm. Tutors assigned for this course are:

Jenny Thompson (CGU), e-mail: [Jennifer.thompson@cgu.edu](mailto:Jennifer.thompson@cgu.edu)  
Monday and Wednesday from 6:30-8:00 pm.

Locke Brown (CMC), e-mail: [wbrown14@cmc.edu](mailto:wbrown14@cmc.edu)  
Sunday and Tuesday from 8:00-10:00 pm

Math Commons Room is located at 209 Adams Hall-down the hall from Poppa lab.