COURSE SYLLABUS

Course number: 2301622
Course title: Real Analysis II
Course credit: 3 credits
Academic year: First semester 2008
Program: M.S., Ph.D. (Mathematics)
Course type: Required/Optional course
Instructor: Kittipat Wong, Ph.D.
Prerequisite: C.F.
Course description:

Product measures; signed and complex measures; differentiation; Banach spaces.

Objectives

The objectives of this course are to provide students with adequate background in real and functional analysis for further study and research in several areas that require the knowledge of integration theory and functional analysis.

Course Outline

1. Product measures 6 hrs.
    - Dynkin's theorem
    - Tonelli and Fubini theorems
2. Signed and complex measures 7 hrs.
    - Definitions
    - Mutual singularity and absolute continuity
    - Hahn, Jordan, and Lebesgue decompositions
    - Radon-Nikodym theorem
3. Differentiation 10 hrs.
    - Differentiation of monotone functions
    - Functions of bounded variation
    - Differentiation of an integral
    - Absolute continuity
4. Basic functional analysis 22 hrs.

- Baire's theorem
- Uniform boundedness principle
- Open mapping theorem and closed graph theorem
- Hahn-Banach theorem and its consequences
- Weak topology and weak convergence
- Riesz representation theorem

Course evaluation

Homework	15%
Class discussion and participation	20%
Midterm exam	30%
Final exam	35%

References

1. Aliprantis & Burkinshaw, *Principles of Real Analysis*, 3rd Edition, Academic Press, 1998.
2. Conway, *A Course in Functional Analysis*, 2nd Edition, Springer, 1994.
3. de Barra, *Measure Theory and Integration*, Ellis Horwood Limited, 1981.
4. Bartle, *The Elements of Integration and Lebesgue Measure*, Wiley, 1995.
5. Bollobas, *Linear Analysis*, Cambridge University Press, 1990.
6. Folland, *Real Analysis*, 2nd Edition, John Wiley & Sons, 1978. Dover, 1982.
7. Kreyszig, *Introductory Functional Analysis with Applications*, John Wiley & Sons, 1978.
8. Royden, *Real Analysis*, 3rd Edition, Macmillan, 1989.
9. Rudin, *Real and Complex Analysis*, 3rd Edition, McGraw Hill, 1987.
10. Yosida, *Functional Analysis*, Classic in Mathematics, Springer, 2003.