Department of Mathematics

Course Profile

Course Number: MATH214	**Course Title:** Introduction to Mathematical Analysis
Required / Elective: Required	**Prerequisites:** Math102
Catalog Description: Real numbers, completeness axiom. Sequences, Cauchy sequences, continuity, uniform continuity; sequences and series of functions. Differentiation. Integration.	**Textbook / Required Material:** W.R. Parzynski, P.W. Zipse, Introduction to Mathematical Analysis, McGraw-Hill, 1987.

Course Structure / Schedule : (3+0+0) 3 / 7 ECTS

Extended Description: The Real Number System: Axioms of real numbers. The extended system of real numbers. The upper and lower bounds. Set Theory: Countable sets. Cardinality. Vector Space Properties of R^n: Vector space. Normed vector space. Inner product space. Metric Spaces: General metric spaces. Interior, exterior, boundary and closure. Open and closed sets. Sequences: Convergence of sequences. Sequences in R. The closure of a set. Cauchy Sequences: Cauchy sequences. Complete metric spaces. Sequences and Compactness: Subsequences. Compact sets. Limits of Functions. Continuity: Definitions of continuity. Consequences of continuity. Uniform continuity. Uniform convergency of functions. Differentiable Functions: The derivative. Properties of differentiable functions. Mean Value Theorem. L'Hopital's Rule. The Riemann Integral: Definition. Properties.

Design content: None	**Computer usage:** No particular computer usage required

Course Outcomes: By the end of the course the students should be able to:
1. prepare for third-year level topics in mathematical analysis **[6],**
2. have a knowledge of the fundamental definitions and theorems of elementary analysis **[6],**
3. allow the student to become acquainted with, and develop a certain level of proficiency in, the techniques and methods of mathematical analysis and to be able to use these techniques and methods to reinforce and solidify an understanding of the learned calculus results **[6].**

[6] have a basic knowledge of the main fields of mathematics, including analysis, algebra, differential equations, differential geometry.

Recommended reading:

J.E. Hutchinson, Introduction to Mathematical Analysis, ANU, 1997.

W. Rudin, Principles of Mathematical Analysis, McGraw-Hill, 3rd Edition, 1976.

M. H. Protter and C. B. Morrey, Jr., Modern mathematical analysis, Reading, Mass., Addison-Wesley, 1964.

S. Abbott**,** Understanding analysis, New York : Springer, 2001.

Teaching methods: Lectures, appropriate handouts which provide students with graphs or examples.

Assessment methods: Quizzes, midterm exams and final exam

Student workload:

      Pre-reading ....25 hrs

      Lectures …………………………………45 hrs

      Preparatory reading ......……………........ 35 hrs

      Problem solving... 45 hrs

      Discussion.. 25 hrs

      TOTAL ……………………………   175 hrs …… to match 25x7 ECTS

| Prepared by : Banu Uzun | Revision Date : 08.02.2010 |