# Department of Mathematics Faculty of Science

**MATH 731 (206731) REAL ANALYSIS I 3(3-0-6)
Prerequisite** Consent of the instructor

**Course Descriptions :**

 Rigorous treatment of topics such as sequences, series and uniform convergence. Differentiation and Lebesgue theory of integration.

**Course Contents No. of Lecture Hours**

1. Sequences and series of functions 9

 - Sequence of functions

 - Convergence

 - Uniform convergence

 - Cauchy criterion for uniform convergence

 - Uniform convergence and continuity, differentiation and integration

 - Series of functions

 - Absolute and uniform convergence

 - Test for uniform convergence

 - Power series

 - Cauchy-Hadamard Theorem

2. Lebesgue measure 10

 - Lebesgue outer measure

 - Properties of Lebesgue outer measure

 - Measurable sets

 - Cantor sets

 - Lebesgue measure

 - Cantor set with positive measure

3. Measurable functions 8

 - Lebesgue measurable function

 - Sequence of measurable function

 - Simple function

 - Convergence in Measure

 - Convergence almost everywhere

**Course Contents No. of Lecture Hours**

4. Integration 10

 - Integration of nonnegative measurable functions

 - Integration of measurable functions

 - Monotone convergence theorem

 - Dominated convergence theorem

 - Comarison with the Riemann integral

5. Differentiation 8

 - Function of bounded variation

 - Integration and differentiation

 - Integration by parts

**คำอธิบายรายวิชาในเล่มหลักสูตร**

 การศึกษาในแนวลึกเกี่ยวกับหัวข้อต่างๆ ได้แก่ ลำดับ อนุกรมและการลู่เข้าสม่ำเสมอ อนุพันธ์ และทฤษฎีเลอเบสก์ของอินทิเกรชัน