# 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