# Department of Mathematics Faculty of Science

**MATH 772 (206772) THEORY OF PROBABILITY II**  **3(3-0-6)
Prerequisite** MATH 771

**Course Descriptions :**

 Sums of independent random variables. Central limit problems. Concept of conditioning. Martingales. Ergodic theorems. Second order random functions.

**Course Contents** **No. of Lecture Hours**

1. Martingale theory 10

 - Conditional expectation

 - Martingales

 - Regular conditional probability

 - L\_p\_ - inequality

2. Sum of independent random variables 10

 - Convergence of random series

 - Applications

 - Martingale techniques

 - Law of iterated logarithm

3. Convergence of distribution functions 10

 - Weak convergence of probability measures

 - Convergence to a normal distribution

4. L\_2\_ - stochastic processes 7

 - Covariance functions

 - Second order calculus

 - Karhunen-Loeve expansion

 - Estimation problems

5. Ergodic theory 8

 - The pointwise ergodic theorem

 - Applications to real analysis

 - Applications to Markov chains

 - The Shannon-McMillan theorem

 Total 45