

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.

<b>Course Contents</b>	<b>No. of Lecture Hours</b>
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