MA836   **STOCHASTIC DIFFERENTIAL EQUATIONS**   **4-0-0-4**

Introduction: Deterministic and random differential equations, stochastic differential, Ito's chain rule.

Probability Theory: Basic definitions, expected value, variance, independence, some probabilistic methods, law of large numbers, central limit theorem, conditional expectation, martingales.

Brownian Motion: Definition, elementary properties, construction of Brownian motion, sample path properties, Markov property.

Stochastic Integrals: Ito's Integral, Ito's chain and product rules, Ito's integral in higher dimensions.

Stochastic Differential Equations: Existence and uniqueness of solutions, properties of solutions, linear stochastic differential equations.

TEXT BOOKS/REFERENCES:

1. Lawrence C. Evans, "*An Introduction to Stochastic Differential Equations*", American Mathematical Society, 2013.
2. Hui-HsiungKuo, "*Introduction to Stochastic Integration*", Springer, 2006
3. Øksendal, B, "*Stochastic Differential Equations*", Fifth Edition, Springer, 2000.