	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Bachelor of Technology**	Year of Regulation	**2018-19**
Department	**Mathematics**	Semester	**VII**

Course Code	Course Name	Pre-Requisite	Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
MA 473	**Stochastic Processes**	**MA 371**	**2**	**0**	**0**	**2**	**50**	**50**	**100**	**200**

Course Objectives	To introduce the fundamental concepts of stochastic process.	Course Outcomes	**CO1**	Able to classify the random processes.
			CO2	Able to determine transition probability matrices.
	To apply these concepts in analyzing several engineering problems.		**CO3**	Able to apply Poisson process to determine the mean occurrence of an event in a specified interval of time.
			CO4	Able to apply important theorems and formulas in modeling renewal process.
			CO5	Able to apply important equations in modeling Brownian motion.

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**2**	**2**													
2	CO2	**2**	**2**													
3	CO3	**2**	**2**													
4	CO4	**2**	**2**													
5	CO5	**2**	**2**													

SYLLABUS

No.	Content	Hours	Cos
I	**Introduction to stochastic processes (SPs)** Definition and examples of SPs, classification of random processes.	**2**	**CO1**
II	**Markov Chains** Definition and examples, transition probability matrices, classification of states of a Markov chain, determination of higher order transition probabilities, Poisson process and its extensions, birth and death process.	**10**	**CO2** **CO3**
III	**Renewal Processes** Renewal processes in discrete time, Renewal processes in continuous time, renewal equation; Stopping time, Wald's equation, renewal theorems.	**6**	**CO4**
IV	**Brownian motion** Wiener processes, differential equations for a Wiener process, Kolmogorov equations, first passage time distribution for a Wiener process.	**6**	**CO5**
Total Hours		**24**	

Essential Readings
1. J. Medhi; “Stochastic Processes”, 3rd edition, New Age International, New Delhi, 2009.
2. S. Karlin & H M Taylor; “A First Course in Stochastic Processes”, 2nd edition, Academic Press, New York, 1975.
Supplementary Readings
1. S. M. Ross; “Stochastic Processes”, 2nd edition, John Wiley and Sons, New York, 1996.