	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Bachelor of Technology**	Year of Regulation	**2018**
Department	**Mathematics**	Semester	**III**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
MA 201	**Integral Transforms and PDEs**	**3**	**1**	**0**	**4**	**50**	**50**	**100**	**200**

Course Objectives	To introduce the fundamental concepts of Fourier series, Fourier transforms and Laplace transforms To introduce their applications to differential equations	Course Outcomes	CO1: Able to find Fourier series, Fourier cosine and sine series for a given periodic function CO2: Able to determine Fourier and inverse Fourier transform of a function and understand the fundamental properties CO3: Able to determine Laplace transform of a function and understand the fundamental properties CO4: Able to apply Fourier and Laplace transform in solving ODEs and PDEs CO5: Able to determine series solution for Legendre's and Bessel's equation CO6: Able to classify the second order PDEs and obtain the solution of heat, wave and Laplace equations by using Fourier series

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	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
2	CO2	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
3	CO3	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
4	CO4	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
5	CO5	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
6	CO6	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**

No.	Content	Hours	COs
I	**Fourier Series**: Periodic functions, trigonometric series, Fourier series of a function with arbitrary period with special emphasis on functions of period 2π, Fourier series of even and odd functions, half-range Fourier series.	**11**	**CO1**
II	**Integral Transforms:** Fourier Transform: Fourier integral theorem, Fourier sine and cosine integrals, complex form of Fourier integral, Fourier transform of derivative of a function, applications of Fourier transform in boundary value problems; Laplace Transform: Laplace transform of a function, existence theorem, Laplace transform of derivatives and integrals, inverse Laplace transform, convolution theorem, use of Laplace transform in solving differential equations**.**	**20**	**CO2 CO3 CO4**
III	**Series Solution to ODE:** Legendre's and Bessel's differential equations.	**6**	**CO5**
IV	**Partial Differential Equations** Introduction to partial differential equations, separation of variable	**11**	**s**
	Total Hours	**48**	

Essential Readings

1. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 10th edition 2015.
2. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, 5th edition, 2016.

Supplementary Readings

1. P. Dyke, "An Introduction to Laplace Transforms and Fourier Series", Springer Undergraduate Mathematics Series, 2005