	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Bachelor of Technology in Mechanical Engineering**	Year of Regulation	**2018**
Department	**Mechanical Engineering**	Semester	**IV**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
ME 214	**Dynamics of Rigid Bodies**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	To understand basic principles of kinetics of particles and rigid bodies.	Course Outcomes	CO1	Illustrate kinamatics and kinetics of particles, system of particles. (Understanding)
			CO2	Apply the Newton's laws of motion to particles, system of particle and rigid bodies (Applying)
	To develop the skills to analyze various problems related to velocity and acceleration analysis of rigid bodies.		CO3	Apply the relation between force, mass and acceleration for system of particles and rigid bodies and solve related problems. (Applying)
			CO4	Utilize the momentum and impulse principles for solving the kinetic and kinematic parameters of engineerig systems (Applying)
			CO5	Solve for the linear, angular momentum and acceleration of rigid bodies (Applying)

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**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**0**
2	CO2	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**3**	**0**
3	CO3	**3**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**3**	**0**
4	CO4	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**0**
5	CO5	**3**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**3**	**2**	**0**

SYLLABUS

No.	Content	Hours	COs
I	**Particle Mechanics** Rectilinear & curvilinear motion; Relative motion. Kinetics of the Particle: Inertial frame, Force, mass & acceleration; Work & energy; Impulse & momentum.	**09**	**CO1**
II	**Mechanics of system of particles** Kinetics of the system of particles: Introduction to system of particle; Work energy principle for the system of particle; Impulse & momentum principle for the system of particle; conversation of energy and momentum.	**05**	**CO2**
III	**Mechanics of rigid bodies** Kinematics of the rigid body Introduction to rigid body; rigid body motion- rotation, absolute motion, relative velocity, relative acceleration; Instantaneous center of zero velocity; Motion relative to rotating axes.	**05**	**CO3**
IV	**Kinetics of the rigid body** Force, mass & acceleration of rigid body, translation, fixed axis rotation, general plane motion; Work & energy relation for the rigid body, virtual work; Impulse & momentum equation for the rigid body.	**12**	**CO4**
V	**Euler's equation** Lagrange's equation. Displacement, Velocity, Acceleration analysis, Graphical / Analytical	**08**	**CO5**
	Total Hours	**39**	

Essential Readings

1. J. L. Meriam, L. G. Kraige, "Engineering Mechanics – Dynamics", Wiley, 7th Edition, 2013.

2. Shames, Shames Irving H., "Engineering Mechanics Statics And Dynamics" , Pearson Education, 4th Edition, 2006.

Supplementary Readings

1. R. C. Hibbler, A. Gupta, "Engineering Mechanics: Statics and Dynamics", Pearson, 11th Edition, 2010.

2. S.Timoshenko, D H Young, J V Rao, and S. Pati "Engineering Mechanics", McGraw Hill, 5th Edition, 2013.