	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**B.Tech in Mechanical Engineering**	Academic Year of Regulation	**2018**
Department	**Mechanical Engineering**	Semester	**I**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
ME 101	**Engineering Mechanics**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives		Course Outcomes		
	This course describes the different laws of forces associated with different engineering elements.		CO1	Able to classify the different laws of forces associated with engineering systems. (Understanding)
	This course introduces the use of force and moments in various working conditions.		CO2	Able to i) Illustrate the use of force and moments in various working conditions (Understanding). ii) solving related problems. (Applying)
	This course illustrates the use of subject knowledge in the fields of engineering.		CO3	Able to identify the equilibrium conditions of engineering structures (truss, beams, frames) under various loads. (Applying)
	This course introduces the states of an engineering elements and structures under various loading conditions.		CO4	Able to solve the practical mechanics problems considering static friction. (Applying)
	This course explains how to solve the practical problems of mechanics to determine the static forces with their magnitudes and directions.		CO5	Able to understand the principle of virtual work and solve related problems. (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**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**
2	CO2	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**
3	CO3	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**
4	CO4	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**
5	CO5	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**

SYLLABUS

No.	Content	Hours	COs
I	Introduction Classification, Basic terminologies, Laws of Mechanics, Units, Characteristics of forces, Vectors, Dimensional homogeneity, Assumptions in mechanics	**03**	**CO1**
II	Compositions of two force system, Resolution of forces, General method of composition of forces, Equilibrium of bodies, Free body diagra. Lami's theorem, Equilibrium of connected bodies	**03**	**CO1**
III	Moment of force, Varignon's theore, Couple, Resolution of a force into a force and couple, Resultant of non-concurrent force system, Equilibrium of non-concurrent system of forces	**04**	**CO2**
IV	Types of supports, Types of beam, Types of loadin, Finding reactions at support	**04**	**CO3**
V	Center of gravity, Centroid, Use of axis of symmetry, Centroid of a composite section, Center of gravity of a flat plate, Difference between center of gravity and centroid, Determination of centroid from first principle	**03**	**CO1 CO2 CO3**
VI	Moment of inertia, Radius of gyration, Polar moment of inertia, Moment of inertia from first principles, Theorems of moment of inertia, Moment of inertia of composite sections, Moment of inertia of standard sections	**03**	**CO3**
VII	Frames, Assumptions in analysis of frame, Nature of forces, Methods of analysis, Method of joints, Method of sections	**04**	**CO3**
VIII	Laws of friction, Angle of friction, angle of repose, cone of friction, Wedges, Problems involving non-concurrent force system Rope/belt friction	**02**	**CO1 CO2 CO4**
IX	Work, Work done by varying force, Energy, Power, Work energy equation for translation , Motion of connected bodies Work done by spring	**03**	**CO2 CO5**
X	Simple harmonic motion, Simple harmonic motion as a sine wave, Simple pendulum	**03**	**CO2 CO5**
	Total Hours	**32**	

Essential Readings

1. F.P. Bear, E. R. Johnston, Vector Mechanics for Engineers, 9th ed.2009, Tata McGraw Hill.

Supplementary Readings

1. H. J. Shah, S. B. Junarkar, Applied Mechanics, 19th Ed.2015, Charotar Publication, Anand.
2. S. S. Bhavikatti, K. G. Rajashekarappa, Engineering Mechanics,1994, Wiley Eastern Ltd.
3. R. C. Hibbeler, Engineering Mechanics –Statics & Dynamics, 11th Ed., Macmillan Publication Co.