



**National Institute of Technology Meghalaya**  
An Institute of National Importance

**CURRICULUM**

Programme	<b>Bachelor of Technology in Mechanical Engineering</b>	Year of Regulation	<b>2018</b>
Department	<b>Mechanical Engineering</b>	Semester	<b>III</b>

Course Code	Course Name	Credit Structure				Marks Distribution				
		L	T	P	C	INT	MID	END	Total	
<b>ME 201</b>	<b>Strength of Materials</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>50</b>	<b>50</b>	<b>100</b>	<b>200</b>	
Course Objectives	To introduce the basic knowledge of mechanics of materials.	Course Outcomes	CO1	Able to understand the concepts of stress and strain as well as the stress-strain relationships for different materials.						
			CO2	Able to analyse the stresses and strains in axially-loaded members, circular torsion members, stress concentration in circular shafts.						
	CO3		Able to solve complex engineering problems related to shear force and bending moment in beams and deflection of beams under various loading conditions.							
	CO4		Able to analyse the principal stresses & strains, maximum shearing stress, Mohr's circle for plane stress & plane strain in structure, thin walled pressure vessel etc.							
	CO5		Able to solve engineering problems related to deformation of columns under various loading condition, strain energy due to various stresses etc.							
To develop an ability to analyse the real engineering problems and design engineering systems.										

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

**SYLLABUS**

No.	Content	Hours	COs
I	<b>Introduction to Stress and Strain:</b> Introduction of Stress, Strain, Normal Stress, Stress-Strain Diagrams, True Stress and True Strain, Hooke's Law, Young Modulus, Compression and Shear Stress, Thermal Stresses etc.	<b>08</b>	<b>CO1</b>
II	<b>Torsion:</b> Introduction, Stresses in a Shaft, Deformation in Circular Shafts, Angle of Twist & Design of Transmission Shafts 3 Stress Concentration in Circular Shafts	<b>07</b>	<b>CO2</b>
III	<b>Design of Beams for Bending:</b> Introduction of Pure Bending, Bending Of Members, Stress Concentrations 3 Shear and Bending Stresses in Beams, Shear Force and Bending Moment Diagram	<b>10</b>	<b>CO1 CO3</b>
IV	<b>Transformation of Stress and Strain:</b> Introduction, Principal Stresses and Strains, Mohr's Circle for Plane Stress and Plane Strain, Thin Walled Pressure Vessel	<b>10</b>	<b>CO1 CO4</b>
V	<b>Deflection of Beams:</b> Introduction, Beam Deformation under Transverse Loading, Statically Indeterminate Beam etc.	<b>07</b>	<b>CO1 CO3</b>
VI	<b>Columns:</b> Introduction, Buckling of Columns, Euler's Formula etc.	<b>06</b>	<b>CO3 CO5</b>
VII	<b>Energy Methods:</b> Introduction, Strain Energy, Castiglione's Theorem etc.	<b>02</b>	<b>CO1 CO5</b>
<b>Total Hours</b>		<b>50</b>	

**Essential Readings**

1. E.P. Popov, "Engineering Mechanics of Solids", Prentice Hall.
2. F.P. Beer, E.R. Johnston (Jr.) and J.T. DeWolf, "Mechanics of Materials", Tata McGraw Hill

**Supplementary Readings**

1. S.P. Timoshenko, "Strength of Materials, Vols. 1 & 2", CBS Publishers.
2. H. Shames and J.M. Pitarresi, "Introduction to Solid Mechanics", Prentice Hall of India
3. R. Subramanian, "Strength of Materials", Oxford University Press.