DARBHANGA COLLEGE OF ENGINEERING

COURSE FILE

OF

ENGINEERING MECHANICS

(ESC 202)

Mr. Vikash Kumar

Assistant Professor

Department of Mechanical Engineering

College Name	**Darbhanga College of Engineering**		
Program Name	**B.Tech Mechanical Engineering**		
Course Name	**Engineering Mechanics**		
Course Code		Course Credit	4
Lecture/Tutorial Per Week	03/00		

Course Coordinator Name	Mr. Vikash Kumar

1. Scope and Objectives of the Course

Engineering Mechanics is the practical application of mechanics concerned with the behaviour of bodies subjected to external forces or displacement. The main objective of this course to help student's development a thorough understanding of the theories and principle and thereby acquire analytical capability required to solve real life problems

On successful completion of the course, the student will be able to, the

i. Use scalar and vector analytic techniques for determining forces in statically determinate structure.

ii. Apply fundamental concepts of kinetics and kinematics of particles for analysis of simple practical problem.

2.Text Books

TB 1: Engineering Mechanics, second edition; Basudeb Bhattacharya, Oxford University Press.

TB 2: Engineering Mechanics, third edition; D.S. Kumar, S.K.Kataria & Sons.

3. Reference books

RB 1: Engineering Mechanics; Timoshenko. McGraw Hill lnc.

3. Other readings and relevant websites :

S. No.	Link of websites
1	http://nptel.ac.in/courses/112103109/
2	http://nptel.ac.in/courses/122104015/

4. Course Plan

Lecture No.	Date of Lecture	Topics	Web links for video lectures	Text Books, Reference Books and other reading materials	Page numbers of the text books
1- 7		**Statics**			
		Force System : Moment of a force about a point and an axis; Equivalent force and moment, Wrench		TB1, TB2,RB1	TB1:3-18 TB2: 1-125
		Assignment 1			

8-13		**Equilibrium**			
		Free body diagram; equations of equilibrium; problems in two and three dimension; plane frames and trusses .		TB1, RB1, RB2	TB1: 46-111 TB2: 126-191
		Assignment 2			
14- 21		**Friction**			
		Laws of Coulomb friction, impending motion problems involving large and small contact surfaces ; square threaded screw; principle of virtual work and stability.		TB1, TB2,RB1	TB1:217-231 TB2:290-331
		Assignment 3			
22-27		**Dynamics**			
		Kinematics and kinetics of particles dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables		TB1, TB2,RB1	TB1: 457-564 TB2: 556-632
Assignment 4					
28-35		**Properties of areas**			
		Center of mass; Moments of inertia; kinematics of rigid bodies; Chasle's Theorem, concept of fixed vector; velocity and acceleration of particles in different frames of references. General plane motion; Euler's equation of motion		TB1, TB2,RB1	TB1: 287-298 TB2: 367-380
Assignment 5					
36-42		**Work & Energy**			

		Impulse and Momentum methods for particles and rigid bodies Conservation of momentum, coefficient of restitution, moment of momentum equation.		TB1, TB2,RB1	TB1:669-678 TB2:532-609
		Assignment 6			

5. Evaluation Scheme

Component 1	Mid semester examination	20
Component 2	class test	5
Component 3	TA	5
Component 4	End Semester Examination	70
Total		100

6. Syllabus

Topics	No. of lectures	Weightage
Statics : Force System : Moment of a force about a point and an axis; Equivalent force and moment, Wrench	7	17%
Equilibrium : Free body diagram; equations of equilibrium; problems in two and three dimension; plane frames and trusses	6	14%
Friction : Laws of Coulomb friction, impending motion problems involving large and small contact surfaces ; square threaded screw; principle of virtual work and stability.	8	19%
Dynamics : Kinematics and kinetics of particles dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables**.**	6	14%
Properties of areas : Center of mass; Moments of inertia; kinematics of rigid bodies; Chasle's Theorem, concept of fixed vector; velocity and acceleration of particles in different frames of references. General plane motion; Euler's equation of motion	8	19%
Work & Energy: Impulse and Momentum methods for particles and rigid bodies : Conservation of momentum, coefficient of restitution, moment of momentum equation	7	17%

7. This document is approved by

Designation	Name	Signature
Course Co-ordinator	**Vikash Kumar**	
H.O.D.	**Vishnu Singh**	
Principal	**Dr. Achintya**	