ME101

Engineering Mechanics

About the Course

08th Jan 2018

Sr. No	Name of Instructor	Div No	Hall No	Class Timing
1	Dr. Shyamanta M. Hazarika	I	L2	Monday: 4-5 PM Tuesday: 3-4 PM Wednesday: 2-3 PM
2	Dr. Arbind K. Singh	II	L3	Monday: 4-5 PM Tuesday: 3-4 PM Wednesday: 2-3 PM
3	Dr. Budhaditya Hazra	III	L2	Monday: 9-10 AM Tuesday: 10-11 AM Wednesday: 11-12 AM
4	Dr. Manmohan Pandey	IV	L3	Monday: 9-10 AM Tuesday: 10-11 AM Wednesday: 11-12 AM

Tutorial Group	Room No.	Tutor	Instructor
MT1	L1	Dr. Nelson Muthu (ME)	Dr. Shyamanta M. Hazarika (ME)
MT2	L2	Dr. R. Ganesh Narayanan (ME)	
MT3	L3	Dr. A.N. Reddy (ME)	
MT4	L4	TUTOR #15 (ME)	
MT5	4G3	Dr. Gautam Barua (CE)	Dr. Arbind K. Singh (CE)
MT6	4G4	Dr. Sajal K. Deb (CE)	
MT7	4001	Dr. K.D. Singh (CE)	
MT8	4005	Dr. Hemant B. Kaushik (CE)	
MT9	3202	Dr. Arup K. Nandy (ME)	Dr. Budhaditya Hazra (CE)
MT10	2101	Dr. P. Khanikar (ME)	
MT11	2102	Dr. Atanu Banerjee (ME)	
MT12	1006	Dr. Sachin S. Gautam (ME)	
MT13	1003	Dr. Bhaskar Kumar (ME)	Dr. Manmohan Pandey (ME)
MT14	1207	Dr. Ganesh Natarajan (ME)	
MT15	1G1	Dr. Karuna Kalita (ME)	
MT16	1G2	TUTOR #16 (CE)	

Tutorial Classes

Friday 0800 – 0855

Tutorial questions will be uploaded to Moodle by every Wednesday.

Mode of conduct:

- Students should come prepared and get doubts clarified by their tutors in the tutorial class.
- In the first 40 minutes, tutors will discuss the problems and answer the queries of students.
- In the last 15 minutes, students will be asked to solve one question and submit at the end of the class.

Assessment Scheme

End-Semester Examination: 40 %

Mid-Semester Examination: 20 %

Quizzes (two): 15 %

Class Participation and Attendance: 10 %

Tutorial Class Participation: 15 % (10% + 5%)

Tutorial Marks Distribution

10% for class-work (one question)
5% for home-work (remaining tutorial questions)

One question will be solved and submitted in the same class and the remaining home-work questions will be submitted in the next class.

Examination and Tutorial Schedule

Examination	Date	Time
Quiz-1	10 Feb 2018 (Sat)	0915 – 1045
Mid-Semester	27 Feb 2018 (Tue)	1400 – 1600
Quiz-2	06 Apr 2018 (Fri)	0745 – 0855
End-Semester	01 May 2018 (Tue)	1400 – 1700

Tutorial #	Date	Time
1	12 Jan 2018 (Fri)	0800 – 0855
2	19 Jan 2018 (Fri)	0800 – 0855
3	25 Jan 2018 (Thu)	0800 – 0855
4	09 Feb 2018 (Fri)	0800 – 0855
5	16 Feb 2018 (Fri)	0800 – 0855
6	23 Feb 2018 (Fri)	0800 – 0855
7	16 Mar 2018 (Fri)	0800 – 0855
8	17 Mar 2018 (Sat)	0800 – 0855
9	23 Mar 2018 (Fri)	0800 – 0855
10	13 Apr 2018 (Fri)	0800 – 0855
11	20 Apr 2018 (Fri)	0800 – 0855
12	27 Apr 2018 (Fri)	0800 – 0855

Course Syllabus

Basic principles: Equivalent force system; Equations of equilibrium; Free body diagram; Reaction; Static indeterminacy. Structures: Difference between trusses, frames and beams, Assumptions followed in the analysis of structures; 2D truss; Method of joints; Method of section; Frame; Simple beam; types of loading and supports; Shear Force and bending Moment diagram in beams; Relation among load, shear force and bending moment. Friction: Dry friction; Description and applications of friction in wedges, thrust bearing (disk friction), belt, screw, journal bearing (Axle friction); Rolling resistance. Virtual work and Energy method: Virtual Displacement; Principle of virtual work; Applications of virtual work principle to machines; Mechanical efficiency; Work of aforce/couple (springs etc.); Potential energy and equilibrium; stability. Center of Gravity and Moment of Inertia: First and second moment of area; Radius of gyration; Parallel axis theorem; Product of inertia, Rotation of axes and principal moment of inertia; Moment of inertia of simple and composite bodies. Mass moment of inertia. Kinematics of Particles: Rectilinear motion; Curvilinear motion; Use of Cartesian, polar and spherical coordinate system; Relative and constrained motion; Space curvilinear motion. Kinetics of Particles: Force, mass and acceleration; Work and energy; Impulse and momentum; Impact problems; System of particles. Kinematics and Kinetics of Rigid Bodies: Translation; Fixed axis rotational; General plane motion; Coriolis acceleration; Workenergy; Power; Potential energy; Impulse-momentum and associated conservation principles; Euler equations of motion and its application.

Books (as prescribed in syllabus)

Texts:

[1] I.H. Shames, Engineering Mechanics: Statics and Dynamics, 4th Ed., PHI, 2002.

[2] F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers, Vol I – Statics, Vol II – Dynamics, 3rd Ed., Tata McGraw Hill, 2000.

References:

[1] J. L. Meriam and L. G. Kraige, Engineering Mechanics, Vol I – Statics, Vol II – Dynamics, 5th Ed., John Wiley, 2002.

[2] R. C. Hibbler, Engineering Mechanics, Vols. I and II, Pearson Press, 2002.

Books (updated list)

Texts:

[1] I.H. Shames, Engineering Mechanics: Statics and Dynamics, 4th Ed., PHI, 2002.

[2] F. P. Beer, E. R. Johnston Jr., D. F. Mazurek, P. J. Cornwell, S. Sanghi: Vector Mechanics for Engineers – Statics and Dynamics, 10th Ed., McGraw Hill, 2013.

[3] J. L. Meriam, L.G. Kraige, Engineering Mechanics Statics, 7th Ed., John Willey, 2012.

[4] J. L. Meriam, L.G. Kraige, Engineering Mechanics Dynamics, 7th Ed., John Willey, 2012.

Plan of Teaching (Till Mid-Sem Exam)

Sl. #	Topics
1	Basic principles: Equivalent force systems, equations of equilibrium, free body diagram, reaction, static indeterminacy; center of gravity and moment of inertia: first and second moment of area.
2	Structures: Difference between trusses, frames and beams, assumptions followed in the analysis of structures, 2D truss, method of joints, method of sections.
3	Frame, Simple beam, types of loading and supports, shear force and bending moment diagram in beams, relation among load, shear force and bending moment.
4	Friction: dry friction, description and applications of friction in wedges, thrust bearing (disk friction), belt, screw, journal bearing (axle friction), rolling resistance.
5	Virtual work and energy method: virtual displacement, principle of virtual work; applications of virtual work principle to machines, mechanical efficiency, work of a force/couple (springs etc.), Potential energy and equilibrium.
6	Kinematics of particles: rectilinear motion, curvilinear motion, use of Cartesian, polar and spherical coordinate system, relative and constrained motion.

Moodle Course

http://intranet.iitg.ernet.in/ → Utilities → Moodle

Course Name: ME 101 Engineering Mechanics 2018

Enrolment Key: ME101 (without space)