

COURSE TEMPLATE

1.	Department/Centre proposing the course	Applied Mechanics
2.	Course Title (<i>< 45 characters</i>)	ENGINEERING MECHANICS
3.	L-T-P structure	3-1-0
4.	Credits	4
5.	Course number	AML110
6.	Status (<i>category for program</i>)	Institute Core (Engineering Arts and Sciences)
7.	Pre-requisites (<i>course no./title</i>)	None
8.	Status vis-à-vis other courses (<i>give course number/title</i>)	
8.1	Overlap with any UG/PG course of the Dept./Centre	No
8.2	Overlap with any UG/PG course of other Dept./Centre	No
8.3	Supercedes any existing course	Intoduction of some new topics in the existing AML110
9.	Not allowed for (<i>indicate program names</i>)	
10.	Frequency of offering	☒ Every sem ☐ 1 st sem ☐ 2 nd sem ☒ Either sem
11.	Faculty who will teach the course All Faculty in Applied Mechanics can teach this course	
12.	Will the course require any visiting faculty?	No
13.	Course objective (<i>about 50 words</i>): An introduction to the fundamentals of Engineering Mechanics with emphasis on force systems, axioms, dynamics of rigid bodies in three dimensions and variational mechanics. Applications to Modelling of Engineering Systems.	
14.	Course contents (<i>about 100 words</i>) (<i>Include laboratory/design activities</i>): Kinematics, Statics, Equations of Motion, Rigid body dynamics, Introduction to variational mechanics	

15. Lecture Outline (with topics and number of lectures)

Module no.	Topic	No. of hours
1	Introduction, point Kinematics: Moving point in various co-ordinate systems (Cartesian, Cylindrical, Path), Examples	4
2	Rigid Body Kinematics: Translation and rotation, Relative motion, angular velocity, General motion of a rigid body, General relative motion, Examples	6
3	Equivalent Force Systems, Resultant forces, Linear and Angular Momentum, Laws of motion (Euler's Axioms), Free Body Diagrams, Dynamics of Point mass models of bodies, Work energy Principle, Impulse momentum Principles.	6
4	Equilibrium of Rigid bodies, distributed forces, Analysis of Structures: Trusses, Forces in Beams: Shear force and Bending Moment	4
5	Frictional Forces, Laws of Coulomb friction, Impending motion	2
6	The inertia tensor, Definition, Transformation properties, The inertia Ellipsoid, Principal Moments of Inertia, Moment of momentum relations for a rigid body, Examples	4
7	Dynamics of rigid bodies, Euler's Equations of Motion, General equations of motion, motion with a fixed axis, Applications and simplifications	7
8	Energy consideration for rigid bodies, Work-Energy Principle, Conservation of Energy, Impulse Momentum method for Rigid Bodies, Application to Impact.	4
9	Introduction to Variational Mechanics: Hamilton's principle; Lagrange's Equations, principle of virtual work, method of minimum potential energy and stability	5
10		
11		
12		
COURSE TOTAL (14 times 'L')		42

16. Brief description of tutorial activities

Example problems on the above topics from simple systems of Mechanical/Civil/Electrical/Automotive/Textile engineering.

17. Brief description of laboratory activities

Module no.	Experiment description	No. of hours
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
COURSE TOTAL (14 times 'P')		

18. Suggested texts and reference materials

STYLE: Author name and initials, Title, Edition, Publisher, Year.

1. "Engineering Mechanics-Statics and Dynamics", Fourth Edition, by Irving H. Shames, Prentice Hall of India Pvt. Ltd. Eastern Economy Edition, 2001.
2. Vector Mechanics for Engineers (in SI Units), 9th Edition, Beer, Johnston, et al. Tata McGraw Hill, 2011.
3. Engineering Mechanics by P.C.Durthir
4. Engineering Mechanics "Statics and Dynamics", Fifth Edition, by J.L. Merium and L.G. Kraige, John Wiley and Sons (Asia) Pvt. Ltd. Singapore, 2002.

19. Resources required for the course (*itemized & student access requirements, if any*)

19.1	Software	
19.2	Hardware	
19.3	Teaching aides (videos, etc.)	
19.4	Laboratory	
19.5	Equipment	
19.6	Classroom infrastructure	
19.7	Site visits	

20. Design content of the course (*Percent of student time with examples, if possible*)

20.1	Design-type problems	15 % (Machine Dynamics, Truss Structures, Robotics)
20.2	Open-ended problems	5 %
20.3	Project-type activity	
20.4	Open-ended laboratory work	
20.5	Others (please specify)	

Date: 01-02-2013


 (Signature of the Head of the Department)