CARLETON UNIVERSITY
Dept. of Mechanical and Aerospace Engineering

COURSE OUTLINE

MAAE 2101 [0.5 credit]

Engineering Dynamics

Review of kinematics and kinetics of particles: rectilinear and curvilinear motions; Newton's second law; energy and momentum methods. Kinematics and kinetics of rigid bodies: plane motion of rigid bodies; forces and accelerations; energy and momentum methods.

Hours per Week:	**Lectures**	**3**
	Problem Analysis	**3**

Week	**Topic**
	Kinetics of Particles
1	Principle of Work and Energy; Power and Efficiency; Conservative Forces and Potential Energy; Conservation of Energy.
2	Principle of Linear Impulse and Momentum; Conservation of Linear Momentum; Impact; Angular Impulse and Momentum.
3	System of Particles; Mass flows.
	Planar Kinematics of Rigid Bodies
4	Rigid Body Motion; Translation, Rotation; Angular Velocity and Acceleration; General Plane Motion; Absolute and Relative Velocity of Two Points on a Single Rigid Body; Velocity Diagrams.
5	Instantaneous Center of Zero Velocity; Absolute and Relative Acceleration of Two points on a Single Rigid Body; Acceleration Diagrams.
6	Absolute and Relative Motion of Two Points on Different Rigid Bodies; Sliding Contact; Motion Relative to Rotating Axes; Coriolis Acceleration; Slider-Crank Mechanisms.
	Planar Kinetics of Rigid Bodies
7	Moments of Inertia; Newton’s Law of Motion for Rigid Bodies Motion; Translation.
8.	Rotation About a Fixed Axis. General Plane Motion.

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COURSE OUTLINE

MAAE 2101: Engineering Dynamics

Week	**Topic**
9.	Principle of Work and Energy for a System of Particles and Rigid Bodies; The Work of a Couple; Conservation of Energy.
10.	Linear and Angular Momentum for Rigid Bodies; Principle of Impulse and Momentum.
11.	Conservation of Momentum; Eccentric Impact.
12.	Mechanical Vibrations. Mass - Spring - Damper System. Free Vibration. Forced Vibration.

Estimated weekly out of class time:	Reading	3 hours
	Problems	3 hours

Assessment:	
Assignments	10%
Mid Term Exam	20%
Final Exam	70%
Total	100%

NOTES:
1) The Final Examination is for evaluation purposes only and will not be returned to the student.
2) To pass this course the student must pass the Final Examination in the course.
3) Lecture notes will be posted on the Internet as long as the attendance in every Lecture Session (A & B) remains higher than 90%. Otherwise the lecture notes will be removed from the Internet.

Instructors:	Prof. F.F. Afagh 3244 ME Tel: ext. 5705	Prof. R. Bell 3254 ME Tel: ext. 6694

Professors Afagh/Bell