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SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

ourse Title	APPLIED MECHANICS
ode No.	MCH 111
rogram:	MECHANICAL
emester	TWO
)ate	JUNE, 1992
ait nor	W. Jenkins

New: Revision:

PPROVED JUAML
Chairperson Date

CALENDAR DESCRIPTION

APPLIED MECHANICS	MCH 111
Course Name	Course Number

PHILOSOPHY/GOALS;

rhis is the second basic course necessary for understanding the ensuing najor subject courses in the Mechanical Programs.

1ETH0D OF ASSESSMENT (GRADING METHOD):

?his course will cover chapter 9-13 inclusive in Introduction to Mechanics, >y Levinson.

ʳou will be tested on chapter 9 and 10 two weeks after completion of these ihapters.

ou will be tested on chapters 11 and 12 two weeks after completion of hese chapters.

'he final test will be administered after completion of chapter 13.

he marking system will be "A", "B", "C", and "X", and tests will be graded n logical solution, layout, sketches and tidiness.

EXTBOOK (S):

ntroduction to Mechanics - Levinson

EFERENCE BOOKS:

pplied Mechanics, Brown - Prentice-Hall

pplied Engineering Mechanics, Jensen & Chenoweth - McGraw-Hill

APPLIED MECHANICS

MCH 111

PERIODS	TOPIC DESCRIPTION
12	Motion
	Speed, velocity and acceleration Distance and displacement Notation Uniformly accelerated bodies Falling bodies Projectiles
12	Rotational Motion
	Angular displacement (radians) Angular velocity and acceleration Relationship between linear and angular motion Moment of inertia of bodies Radius of gyration Kinetic energy of rotation Torque Angular momentum
12	Force & Motion
	Newton's Second Law Accelerating forces - horizontal & vertical motion
14	Work, Energy and Power
	Definitions, units, measurements Concepts of work Work done by constant and variable forces Forms of energy - potential and kinetic Conservation of energy
10	Impulse and Momentum
	Linear impulse Linear momentum Conservation of momentum Impact

Course based on two periods of theory and two periods of lab.

UNIT #1 - Kinematics of Particles

General Objective:

The student will be able to solve varied problems dealing with the Kinematic of Particles.

Specific Objectives:

1. To be able to define rectilinear or tanslational motion,
2. To be able to define curvilinear,
3. To be able to define plane motion,
4. To be able to define distance,
5. To be able to define displacement(s).
6. To be able to define speed.
7. To be able to define velocity (v).
8. To be able to distinguish between absolute velocity and relative velocity.
9. To be able to define uniform motion,
10. To be able to define acceleration (a).
11. To be able to define uniformly accelerated motion,
12. To be able to state the equation y = u + at
13. To be able to state the equation 2 = u + 1/2 at
    To be able to state the equation v = u + 2as «
R5. To be able to define the term normal acceleration = y r
16. Using the above specific objectives the student will solve correctly the following problems in the textbook: Qu. 9-1, 2, 3, 6, 7, 13, 14, 15, 22, 23, 24, 25, 28, 32, 35, 39, 40, 42, 46, 47, 48, 49.

UNIT #2 - Kinematics of Rigid Bodies

General Objectives:

The student will be able to solve varied problems dealing with the Kinematic of Rigid Bodies.

Specific Objectives:

1. To be able to differentiate between a particle and a body.
2. To be able to define a machine,
3. To be able to define a mechanism.
4. To be able to define rectilinear translation.
5. To be able to define rotation.
6. To be able to define angular displacement (A),

7. To be able to define angular distance.
8. To be able to define angular velocity ( ).
9. To be able to define angular acceleratin ( ),
10. To be able to state the relationship S = Ar.
11. To be able to state the relationship v =
12. To be able to state the relationship a =
13. To be able to recall the formula normal acceleration An
14. To be able to state the formula: normal acceleration An = w
15. Using the above specific objectives the student will correctly solve the following problems in the textbook: Qu. 10-1, 2, 4, 5, 7 10, 12, 13, 14, 15, 16, 17, 18, 19, 25, 27, 46, 51, 55.

UNIT #3 - Kinetics

General Objective:

The student will be able to solve varied problems dealing with kinetics

Specific Objectives:

1. To be able to state the Second Law of Motion.
2. To be able to define the term slug.
3. To be able to recall vector addition.
4. To be able to draw free-body diagrams for force systems.
5. To be able to recall that the friction force = the co-efficient of friction x the normal force.
6. To be able to define the term Inertia force.
7. To be able to define the term dynamic equilibrium.
8. To be able to define the term centrifugal force.
9. To be able to define the term centripetal force.
10. To be able to define the term Moment of Inertia.
11. To be able to obtain the Radius of Gyration for rotating bodies.
12. To be able to define the term Inertia Torque.
13. To be able to obtain referred Moments of Inertia.
14. Using the above specific objectives, the student will solve correctly the following problems from the textbook: Qu. 11-2, 3, 4, 11, 12, 13 14,, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 39, 40, 45, 46, 48, 49, 53, 54, 63, 64, 65.

pJNIT #4 - Work, Energy and Power

General Objectives:

The student will be able to solve varied problems dealing with Work,/Energy and Power.

Specific Objectives;

1. To be able to define the term work.
2. To be able to identify positive and negative work.
3. To be able to calculate work from a work diagram.
4. To be able to define spring stiffness or soring modulus.
5. To be able to define strain energy of spring.
6. To be able to calculate the energy stored in a spring.
7. To be able to define the work done by Torque and Couple.
8. To be able to define the term Potential Energy.
9. To be able to define the term Kinetic Energy.
10. To be able to state the formula for Potential Energy.
11. To be able to state the formula for Kinetic Energy.
12. Using able to state the formula for Kinetic Energy (linear).
13. correc the above specific objectives the student will solve tly the following problems from the textbook: Qu. 12-4, 5, 6, 11, 12 , 13, 14, 18, 20, 24, 27, 28, 29, 34, *36,* 37, 38, 40, 42, 43, 44, 49 , 50, 60, 62.

UNIT #5 - Impulse and Momentum

General Objective:

The student will be able to solve varied problems dealing with impulse and momentum.

Specific Objectives

1. To be able to state the formula: impulse = P t
2. To be able to state the formula: momentum = m v
3. To be able to state the formula: angular impulse = T t
4. To be able to state the formula: momentum = I w.
5. To be able to recall Newton's third law of motion.
6. To be able to state the law of conservation of momentum.
7. To be able to state the law of conservation of angular momentum.
8. To be able to define the co-efficient of restitution.
9. Using the above specific objectives the student will solve correctly the following problems from the textbook: Qu. 13-4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 18, 20, 21, 22, 23, 25, 26, 27, 20, 30, 32, 33, 35, 42, 43.