

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: MECHANICS OF MACHINES

CODE NO: MCH 205

SEMESTER:

PROGRAM' MECHANICAL TECHNOLOGY

AUTHOR: BRUCE PROUT

DATE: JAN. 1992

PREVIOUS OUTLINE DATED:

FEB. 1984

APPROVED:

Pitt

&-o<,D7

Dot

MECHANICS OF MACHINES - MCH 205

COURSE DURATION - 48 HOURS

PROFESSOR - MR. BRUCE PROUT

1.0 INTRODUCTION

1.1 Course Objectives

Mechanics of Machines is a study of motion, masses and forces in machines. Such knowledge is required for design and specification of mechanisms and machines.

MCH 205 continues with the study of Kinematics, taking into account accelerations that exist in mechanisms. New topics of study are friction, statics and kinetics, applied to machines and mechanisms.

1.2 Performance Objectives

Upon successful completion of this course, the student will have demonstrated:

- a) a knowledge of acceleration and velocity relationships that exist between members of a mechanism in motion.
- b) an ability to solve for accelerations in mechanisms, using analytical and graphical methods.
- c) an ability to produce neat and accurate acceleration polygons.
- d) an understanding of static force relationships that exist in machines.
- e) an understanding of friction and the effect of friction in machines.
- f) an ability to solve for static and friction forces.
- g) an understanding of inertia forces, and their effect on machine members.
- h) an ability to solve for inertia forces.
- i) if studied as part of this course, an understanding of balancing, vibration, and critical speeds, with respect to machine dynamics.

1.3. Course Structure

- a) Review of MCM 204 - terminology
 - skeleton outlines
 - velocity analysis using method of relative velocity
- b) Accelerations in Mechanisms
 - relationships
 - pattern of solution for points on same link
 - graphical method of solution using relative velocities
 - proportionality of accelerations
 - * - solution for accelerations between points not on same link, using method of equivalent linkages.
- c) Static Force Analysis of Machinery
 - equilibrium
 - magnitude and direction of forces
 - force polygons
 - friction
- d) Inertia forces in Machinery
 - terms and definitions
 - solving for inertia forces
 - dynamic force analysis
 - combined static and inertia force analysis
 - kinetic equivalent systems
- * e) Balancing Rotation Masses
- * f) Vibrations and Critical Speeds in Shafts

NOTE - * indicates these topics will be covered only if time permits.

1.4 Learning Methods

- a) Topic Discussion and demonstrations
- b) Individual reading and study
- c) Summary notes
- d) Practice problem solving
- e) Tests and assignments

1.5 Textbooks

- 1/ Basic Graphical Kinematics - Harold B. Kepler
- 2/ Mechanics of Machinery - Ham, Crane, Rogers

1.6 Supplies Required

- 1/ 8 1/2 " x 11 " square grid paper
- 2/ Drafting supplies including scales, set squares, protractor, compass, divider, pencils
- 3/ 3 - ring note binder

2.0 GRADING

2.1 Final Mark

Final marks will be compiled in the following way

Tests	70%
Quizzes/Assignments	30%

2.2 Final Grade

Final grade will be assigned according to the final mark as follows:

A+ =	90% - 100%
A =	75% - 89%
B =	65% - 74%
C =	55% - 64%
I =	less than 55%

NOTES

Students having I grades may be given opportunity to repeat up to two "incomplete" tests, one time only. If the revised average is over 55%, the previous "I" grade will be replaced with a "C" grade (55%). If revised final mark is not over 55%, a final "R" grade will be assigned, and the student will be obliged to repeat the course.

Qualification for test re-write opportunity will be a greater than 80% quiz and assignment completion status, and regular class attendance.

2.3 Tests

A minimum of three written tests are planned throughout the term.

There will at least one week notice provided for each test, to allow for preparation.

Students who will be absent for a scheduled test must contact the instructor in ADVANCE. Students absent without prior notification and a valid reason will be assigned a "ZERO" grade for the missed test.

2.4 Quizzes

Quizzes will be held without notice, throughout the term. One of the purposes of quizzes is to encourage regular attendance. Students who are absent the day of a quiz will be given a "ZERO" grade, unless the instructor was contacted in ADVANCE. Having a valid reason, the student will be given the opportunity to write the quiz, There will be no "re writes" for "I" grade quizzes.

2.5 Assignments

Homework assignments may be given throughout the term. Late and unsubmitted assignments are considered not completed, and will be given a "zero" grade, unless PREVIOUS arrangements were made with the instructor.

3.0 Classroom Order

- a) Discussion, questions, and general interaction will be encouraged as positive features of the learning process
- b) Disruptive conduct is not acceptable.
- c) Other course work or study is not permitted during lecture or lab periods.
- d) Honesty, fairness and respectable treatment of others a basic principles that will govern at all times.

4.0 Subject to Change

In the case of special circumstance, the instructor has the option of modifying guidelines in the course outline.