SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: **APPLIED MECHANICS**

CODE NO. : **MCH 111** **SEMESTER:** **TWO**

PROGRAM: **AVIATION TECHNOLOGY (FLIGHT)**

AUTHOR: **G. DISANO**

DATE: **JAN 2001** **PREVIOUS OUTLINE :** **JAN 1994**

APPROVED:

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DEAN **DATE**

TOTAL CREDITS: **4**

PREREQUISITE(S): **PHY 125 & MCH 110**

HOURS/WEEK: **3**

I. COURSE DESCRIPTION:

This second course in mechanics, Dynamics, deals with chapters 10 to 15 inclusive, of the reference text by Walker. It provides both a review of, and a more in-depth study of many of the concepts of dynamics introduced in the first semester physics course. The student will also be exposed to a number of concepts not previously encountered in either semester one Statics (MCH 110) or semester one Physics (PHY 125).

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Kinematics of Particles

   Potential Elements of Performance:

   a) Distance and Displacement
   b) Speed and Velocity
   c) Acceleration
   d) Uniformly Accelerated Motion
   e) Falling Bodies – the acceleration due to gravity
   f) Projectiles

2. Rotational Motion

   Potential Elements of Performance:

   a) Angular Displacement (radians)
   b) Angular Velocity
   c) Angular Acceleration
   d) Angular Motion with uniform acceleration
   e) Relationship between Rectilinear Motion and Angular Motion
   f) Normal and Tangential Acceleration

3. Kinetics: Forces and Motion

   Potential Elements of Performance:

   a) Newton's Second Law of Motion
   b) Accelerating Forces – horizontal and vertical motion
   c) Dynamic Equilibrium – the Linear Inertia Force
   d) Angular Dynamic Equilibrium – the Angular Inertia Torque

4. Work, Energy and Power

   Potential Elements of Performance:

   a) The concept of Work
   b) Work done by constant forces
   c) Work done by variable forces
   d) Energy
   e) Gravitational Potential Energy
   f) Kinetic Energy
   g) Conservation of Energy – Translational
   h) Moment of Inertia of bodies
   i) Kinetic Energy of Rotation
   j) Conservation of Energy – Angular
   k) Power
   l) Efficiency

5. Impulse and Momentum

   Potential Elements of Performance:

   a) Linear Impulse
   b) Linear Momentum
   c) Angular Impulse
   d) Angular Momentum
   e) Conservation of Momentum

III. TOPICS:

1. Kinematics of Particles: the Study of Motion
2. Rotational Motion
3. Kinetics: the Relationship between Forces and Motion
4. Work, Energy and Power
5. Impulse and Momentum

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Walker, Keith M., APPLIED MECHANICS FOR ENGINEERING TECHNOLOGY, 6th edition. Prentice Hall, Inc. Englewood Cliffs, New Jersey

Bueche, Frederick J., SCHAUM'S OUTLINE SERIES – THEORY and PROBLEMS OF COLLEGE PHYSICS, 8th edition. McGraw-Hill Publishing Company. Toronto. 1989

V. EVALUATION PROCESS/GRADING SYSTEM:

Your final grade in MCH 111 will be determined on the basis of four tests to be administered during the semester. Each test will examine your knowledge of a number of topics and will be administered within one week of completing those topics. The topics covered in each of the four tests are as follows:

Test #1 --- Topic No. I
Topic No. II
Test #2 --- Topic No. III
Test #3 --- Topic No. IV
Test #4 --- Topic No. V

The four tests are of equal weight (ie. each of the four tests is worth 25% of your final grade). As a result, provided you have received a passing grade in each of the unit tests, your final grade will simply be an average of your four test results. In order to obtain your letter grade the following percentage-letter grade equivalents will be used:

Grade	Definition	Grade Point Equivalent
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating	

	circumstances giving a student additional time to complete the requirements for a course (see *Policies & Procedures Manual – Deferred Grades and Make-up*).
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has not been possible for the faculty member to report grades.

If your final average is below 59%, or if you have received a failing grade in one or more of the unit tests, whether you received an "X" (Incomplete) or an "R" (Repeat) grade is entirely at the instructor's discretion. The decision will be based upon your final average (e.g. 32% would result in an R grade while 55% might result in an X grade); your attendance during the semester; your attitude while in the classroom; your perceived level of effort during the semester, etc.

In any case, should you find yourself with an X grade at the end of the semester, in order to upgrade your mark to a passing grade you will be required to write a make-up examination covering the entire course content. Should you receive a passing grade on the make-up examination (60% or higher) your X grade as a result of a failing average is a C! If you were required to write the make-up examination as a result of having failed one test you may substitute the exam result for this test result.

Prior to administering any test you will be notified a full week in advance. Should you, for any reason, not be able to be in attendance on a day for which a test has been scheduled it is your responsibility to notify the instructor prior to the test! If your reasons are acceptable, a date will be set during which you may write a substitute test for the one you have missed.

VI. SPECIAL NOTES:

Special Needs:
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

Retention of course outlines:
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:
Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:
The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean’s secretary. Students will be required to provide a transcript and course outline related to the course in question.