

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**SAULT  
COLLEGE**

**COURSE OUTLINE**

**COURSE TITLE:** Applied Mechanics - Dynamics  
**CODE NO. :** MCH111 **SEMESTER:** 4  
**PROGRAM:** Aviation Technology - Flight  
**AUTHOR:** Updated by Douglas McKinnon  
**DATE:** Jun 2013 **PREVIOUS OUTLINE DATED:** Aug 2012  
**APPROVED:**  
**“Greg Mapp”** **Aug 30/13**  
**Aviation Operations Manager** **DATE**  
**TOTAL CREDITS:** 4  
**PREREQUISITE(S):** MCH110 and PHY125  
**HOURS/WEEK:** 3

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***For additional information, please contact Greg Mapp, Aviation Operations Manager.***

***(705) 759-2554, Ext. 2865***

## I. COURSE DESCRIPTION:

This second course in classic mechanics, *Dynamics*, deals with chapters 10 to 15 inclusive, of the reference text by Walker. It provides an in-depth study of the physical concepts related to motion. The student will be exposed to a number of concepts and equations related to planar and rotational motion; able to identify and quantify forces affecting motion; able to describe and quantify forces and units of measure, related to work, energy and power.

## II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

- 1) in his or her own words write definitions for the concepts introduced;
- 2) answer questions requiring an understanding of the concepts presented;
- 3) respond to questions requiring extrapolation of the course content;
- 4) solve problems requiring an understanding of the course theory and content as described:

### 1. Kinematics of Particles

Potential Elements of the 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 and Projectile Motion

### 2. Rotational Motion

Potential Elements of the 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
- g) Total Angular Acceleration

### 3. **Kinetics: Forces and Motion**

Potential Elements of the 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 the 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 the 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, 8<sup>th</sup> edition. Pearson Prentice-Hall Publishers, Upper Saddle River, New Jersey. 2008  
ISBN-13: 978-0-13-172151-7**

**Scientific Calculator**

*(Absolutely NO graphic calculators, cellphones, smart phones or general purpose computing devices allowed during testing)*

## V. EVALUATION PROCESS/GRADING SYSTEM:

Final grade will be awarded based on the composite score of tests and quizzes as follows:

Tests	70%
<u>Quizzes</u>	<u>30%</u>
Total	100%

The percentages shown above may be adjusted to accurately evaluate student skills. Students will be notified of any changes made.

Each test/quiz are of equal (i.e. proportional), "weight" regarding grading. Each will examine your knowledge of a number of topics and will be administered within one week of completing those and related topics. Prior to administering any test you will be notified a full week in advance.

Should you, for any reason (*within reason of course*) not attend for a test which has been scheduled, it is ***your responsibility*** to notify the professor ***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. Acceptance is based solely on the discretion of the Professor.

Quizzes are intended to account for student attendance, ensure that the student has a general understanding of the concepts being taught, and if assigned homework is being accomplished in a timely manner. ***Quizzes can be administered without prior notice.*** There are no substitute or make-up quizzes. Your lowest quiz score will be excluded from the final grading scheme.

In order to obtain your letter grade the following percentage-letter grade equivalents will be used:

The following semester grades will be assigned to students:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	
A	80 – 89%	4.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00

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F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

**VI. SPECIAL NOTES:**Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

***Once the classroom door has been closed, the learning process has begun. Late arrivers will not necessarily be granted admission to the room. This decision lies solely with the Professor.***

**VII. COURSE OUTLINE ADDENDUM:**

1. 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.
2. 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.

3. Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

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

4. Accessibility Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Accessibility Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

5. Communication:

The College considers ***Desire2Learn (D2L)*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of this Learning Management System (LMS) communication tool.

6. Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. 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.

7. Tuition Default:  
Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of *June* will be removed from placement and clinical activities due to liability issues. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.
  
8. Student Portal:  
The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to <https://my.saultcollege.ca>.
  
9. Electronic Devices in the Classroom:  
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.