



## COURSE OUTLINE: MCH111 - APPLIED MECHANICS

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Approved: Greg Farish, Chair, Aviation Technology - Flight

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| <b>Course Code: Title</b>                                             | MCH111: APPLIED MECHANICS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Program Number: Name</b>                                           | 4061: AVIATION TECHNOLOGY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Department:</b>                                                    | AVIATION TECHNOLOGY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Academic Year:</b>                                                 | 2023-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Course Description:</b>                                            | This course advances the study of mechanics into the area of dynamics. Topics include: KINEMATICS (uniformly accelerated motion, projectile motion, circular motion, Newton's Second Law rectilinear and angular motion), inertia, dynamic equilibrium (work, energy forms, power, efficiency), impulse and momentum (linear and angular), dynamic friction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Total Credits:</b>                                                 | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hours/Week:</b>                                                    | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Total Hours:</b>                                                   | 45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Prerequisites:</b>                                                 | MCH298                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Corequisites:</b>                                                  | There are no co-requisites for this course.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Essential Employability Skills (EES) addressed in this course:</b> | EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.<br>EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.<br>EES 3 Execute mathematical operations accurately.<br>EES 4 Apply a systematic approach to solve problems.<br>EES 5 Use a variety of thinking skills to anticipate and solve problems.<br>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.<br>EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.<br>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.<br>EES 10 Manage the use of time and other resources to complete projects.<br>EES 11 Take responsibility for one's own actions, decisions, and consequences. |
| <b>General Education Themes:</b>                                      | Science and Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Course Evaluation:</b>                                             | Passing Grade: 50%, D<br><br>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Books and Required Resources:</b>                                  | Applied Mechanics for Engineering Technology by Keith M. Walker<br>Publisher: Pearson Prentice-Hall Edition: 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



**Course Outcomes and Learning Objectives:**

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|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Outcome 1</b>                    | <b>Learning Objectives for Course Outcome 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Kinematics of Particles                    | <ul style="list-style-type: none"> <li>a) Distance and Displacement</li> <li>b) Speed and Velocity</li> <li>c) Acceleration</li> <li>d) Uniformly Accelerated Motion</li> <li>e) Falling Bodies - the acceleration due to gravity</li> <li>f) Projectiles and Projectile Motion</li> </ul>                                                                                                                                                                                |
| <b>Course Outcome 2</b>                    | <b>Learning Objectives for Course Outcome 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Rotational Motion                          | <ul style="list-style-type: none"> <li>a) Angular Displacement (radians)</li> <li>b) Angular Velocity</li> <li>c) Angular Acceleration</li> <li>d) Angular Motion with uniform acceleration</li> <li>e) Relationship between Rectilinear Motion and Angular Motion</li> <li>f) Normal and Tangential Acceleration</li> <li>g) Total Angular Acceleration</li> </ul>                                                                                                       |
| <b>Course Outcome 3</b>                    | <b>Learning Objectives for Course Outcome 3</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Kinetics: Forces and General Planar Motion | <ul style="list-style-type: none"> <li>a) Newton's Second Law of Motion</li> <li>b) Accelerating Forces - horizontal and vertical motion</li> <li>c) Dynamic Equilibrium - the Linear Inertia Force</li> <li>d) Angular Dynamic Equilibrium - the Angular Inertia Torque</li> </ul>                                                                                                                                                                                       |
| <b>Course Outcome 4</b>                    | <b>Learning Objectives for Course Outcome 4</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Work, Energy and Power                     | <ul style="list-style-type: none"> <li>a) the concept of work</li> <li>b) Work done by constant forces</li> <li>c) Work done by variable forces</li> <li>d) Energy</li> <li>e) Gravitational Potential Energy</li> <li>f) Kinetic Energy</li> <li>g) Conservation of Energy Translational</li> <li>h) Moment of Inertia of bodies</li> <li>i) Kinetic Energy of Rotation</li> <li>j) Conservation of Energy - Angular</li> <li>k) Power</li> <li>l) Efficiency</li> </ul> |
| <b>Course Outcome 5</b>                    | <b>Learning Objectives for Course Outcome 5</b>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Impulse and Momentum                       | <ul style="list-style-type: none"> <li>a) Linear Impulse</li> <li>b) Linear Momentum</li> <li>c) Angular Impulse</li> <li>d) Angular Momentum</li> <li>e) Conservation of Momentum</li> </ul>                                                                                                                                                                                                                                                                             |

**Evaluation Process and Grading System:**

| <b>Evaluation Type</b> | <b>Evaluation Weight</b> |
|------------------------|--------------------------|
| Quizzes                | 40%                      |
| Tests                  | 60%                      |



**Date:** June 1, 2023

**Addendum:** Please refer to the course outline addendum on the Learning Management System for further information.

