ROCHESTER COMMUNITY AND TECHNICAL COLLEGE COMMON COURSE OUTLINE

Course discipline/number/title: AVIA 2115: Theory of Flight

A. CATALOG DESCRIPTION
1. Credits: 3
2. Hours/Week: 3
3. Prerequisites (Course discipline/number): AVIA 1310, AVIA1321
4. Other requirements: Requires completion of prerequisite program courses with a C or better.
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: A study of physics and aerodynamic principles of flight and propulsion systems. The nature of aerodynamic forces, flight principles of lighter-than-air, airplane, glider, rotocraft and powered lift are covered in detail.

C. DATE LAST REVISED (Month, year): November, 2022

D. OUTLINE OF MAJOR CONTENT AREAS:
1. Earth's atmosphere on aircraft performance
2. International Standard Atmosphere (ISA) introduction and use in calculations
3. Basic subsonic and supersonic aerodynamics required for the calculation of large transport-category aircraft performance
4. Basic propulsion systems and its use to calculate the performance of modern high-altitude flying large transport-category aircraft
5. Dynamic equations of aircraft stability in all six degrees of freedom and the special and important cases of stability
6. Aircraft (Airplane) Takeoff and Landing performances
7. Symmetric and asymmetric thrust
   a) Drag
   b) Performance speeds
   c) Compensating techniques
   d) Contaminated runways
   e) Braking effects
8. Climbing performances and schedules to minimize operating expenses and increase safety
9. Descent performances and power and trust curves
10. Cruise techniques and calculation of important cruise parameters
11. Range and endurance performances, minimum fuel consumption and optimum altitudes
12. Maneuvering (turning) performance in various planes of rotation and its effect to performance reduction and safety speeds.
13. Decision making on safe flight operation during flight conditions and hazards.

E. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Describe the effect of the earth's atmosphere on the aircraft performance and International Standard Atmosphere (ISA).
2. Explain the basic subsonic and supersonic aerodynamics for the calculation of large transport-category aircraft performance.
3. Explain basic propulsion systems for calculation of the performance of modern high-altitude flying large transport-category aircraft.
4. Describe the basic concepts of stability and control and its effect on aircraft performance.
5. Explain Aircraft Takeoff and Landing performances factors.
6. Describe effects of symmetric and asymmetric trust, drag, performance speeds, techniques, contaminated runways, braking effects, pilot techniques.
7. Understand climbing performances and schedules and impact on operating expenses and safety.
8. Explain cruise techniques and impact on performance.
9. Calculate important cruise parameters.
10. Explain maneuvering (turning) performance in various planes of rotation will be discussed and its effect to performance reduction and safety speeds.

E. LEARNING OUTCOMES (GENERAL): The student will be able to: Continued. . .
11. Describe how aerodynamic performance impacts safe flight operations
12. Demonstrate ability to make sound judgment and decisions regarding flight conditions and hazards.

F. LEARNING OUTCOMES (MNTC): NA

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Quizzes
2. Exams

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s): Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any): None