ND TRADE, INDUSTRY AND TECHNOLOGY FRAMEWORKS
Aviation Technology I

Course Code	Course Name/ Course Description	Grade Levels	High School Credit Options
17812	Students are provided with an understanding of the science of flight and include the history and possible career paths within the aviation industry. Aviation covers physics, the relationships of weight and balance, principles of navigation and flight control, ground and airport operations and services, and Federal Aviation Administration regulations.	**10-12**	**1 or 2**

Topic	Student Performance Expectations
People, Events and Trends in Aviation	• Discuss important people in aviation history and their contribution to the field of aviation • Determine the progression of aviation technology (e.g., Pre-Heavier than air flight, gliders (pre-Wright brothers), World War I and II, the jet age and NextGen aviation) • Identify current issues in aviation
Aircraft Basics	• Identify the components of different types of aircraft ➢ Exterior and Interior • Compare and contrast categories and classes of aircraft
Aircraft Flight Instruments	• Identify the seven basic/standard instruments • Describe the operation/limitations of the pitot-static system • Describe the operation/limitations of the gyroscopic system • Describe the operation/limitations of the magnetic system
Flight Systems	• Explain the function of the battery, alternator, and magneto • Discuss fuel systems • Explain the cycle of an internal combustion engine • Describe common errors with the induction system • Compare differences between fixed pitch and constant speed propellers
Aerodynamics of Flight	• Describe and explain the relationship the four forces of flight • Define the angle of attack and critical angle of attack

	• Describe the types of drag ➢ Parasite and induced • Explain how wing tip vortices are created • Discuss and compare the four main types of wing flaps • Explain how Newton's Third Law and Bernoulli's principle affect lift • Identify the parts of an airfoil (e.g., chord line, relative wind, camber, leading edge, trailing edge) • Describe the aerodynamics of a stall • Define static and dynamic stability
Airport Operations	• Discuss the five legs of a standard traffic pattern • Describe how runway numbers are determined • Recognize various types of airports • Explain the purpose of a displaced threshold • Explain the purpose of a blast pad • Recognize visual aids and their purpose (e.g., signs, lights, and markings)
Airspace	• Compare the classes of controlled and uncontrolled airspaces • Identify the airspace dimensions needed for each class of airspace • Recognize various classes of airspace on sectional charts • Identify the minimum weather requirements for each class of airspace • Categorize the pilot qualifications needed for each class of airspace • Explain the aircraft requirements for each class of airspace • Determine when it would be necessary to request a special VFR clearance
Flight Communication	• Demonstrate use of the phonetic alphabet and numbers • Convert local times to Zulu time and vice versa • Discuss the purpose of the following facilities/frequencies: ground control, tower, CTAF, Unicom, FSS, approach/departure control, ATIS and enroute center • Describe the purpose of an airplane's transponder • Explain the standard and emergency squawk codes • Explain light gun signals and their purpose

Weather Theory	• Identify the gases within the atmosphere • Describe factors that affect atmospheric weather patterns • Explain the formation of clouds and the conditions necessary to form each type • Explain and compare the various types of precipitation • Explain the importance of atmospheric stability • Compare dew point and humidity • Identify the various stages of thunderstorms and the hazards to flight
Weather Products	• Identify TAF codes (e.g., TEMPO, FM) • Explain TAFs • Compare current Area forecasts with TAF • Explain the importance of a winds aloft forecast • Identify abbreviations (e.g., RA, BR, and SN) used in METAR weather reports • Decode METARs • Determine weather products issuance and valid times • Describe how to obtain official weather briefings
Weight and Balance	• Define weight and balance terms (e.g., center of gravity, basic empty, weight and useful load) • Identify the methods of calculating weight and balance • Explain the effects of weight on aircraft performance • Explain the effects of forward/aft center of gravity on aircraft performance • Determine the center of gravity using the computation method
E6B Flight Computer	• Calculate Time/Distance/Rate problems • Compute groundspeed and wind correction angle
Navigation	• Identify pilotage and dead reckoning techniques • Explain when radio navigation would be beneficial • Plan a flight using VOR navigation techniques • Plan a flight using NDB navigation techniques • Plan a flight using GPS navigation techniques

	• Demonstrate appropriate radio navigation techniques using VOR, NDB, and GPS
Cross Country Flight Planning	• Demonstrate use of flight planning tools (e.g., AFD, E6B, and Plotter Sectional charts) • Plan a XC flight using multiple navigation techniques • Complete nav-log for preflight planning • Demonstrate a XC flight using a flight simulator
Aviation Training Requirements	• Describe flight training processes • Determine the period of time for medical certificate validity • Identify the mission of aviation organizations (e.g., AOPA, EAA, CAP) • Determine FAA Pilot certificate requirements
Flight Physiology	• Discuss the IMSAFE checklist • Describe the medical qualifications requirements for pilots • Identify each type of hypoxia and associated causes • Describe symptoms of hypoxia • Describe corrective actions for hypoxia • Explain the development of night vision • Discuss the importance of spatial awareness and disorientation
Aviation Careers	• Identify career opportunities in aviation • Identify current career trends in aviation • Discuss pathways to an aviation career