

# Wallenpaupack Area School District Planned Course Curriculum Guide

## BCIT - Aviation

### Instrument Written Test Prep

#### Course Description:

Students will learn, study, and practice the standards necessary to complete the FAA instrument pilot written exam. Course content includes applicable Federal Aviation Regulations for IFR flight operations, air traffic control procedures, meteorology, instrument charts, and instrument flight planning. Coursework will be supplemented with simulator time and access to actual aviation environments off campus when applicable.

#### Initial Creation Date (if applicable) and Revision Dates:

Fall 2023

<b>Wallenpaupack Area School District Curriculum</b>	
<b>COURSE:</b> WASA Instrument Written Test Prep	<b>GRADE/S:</b> 11-12
<b>UNIT 1:</b> Instrument ground	<b>TIMEFRAME:</b> Semester / every day

**PA COMMON CORE/NATIONAL STANDARDS:**  
 FAA CFR 14 Chapter 1 Sub chapter H Appendix C to 141

**UNIT OBJECTIVES (SWBATS):**  
 Students will be able to demonstrate procedures and proficiency standards required to successfully complete the FAA Instrument pilot written exam.

**INSTRUCTIONAL STRATEGIES/ACTIVITIES:**  
 Recitation / Lecture / Flight Simulator / Flight planning / supplemental activities at aviation environments off campus.

**ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):**  
 Students will complete stage checks including instrument flight planning, simulator flight reviews / Exams / Research / Formal presentations.

**DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment):**  
 Instruction will focus on real-world content, activities, and common practices associated with aviation careers. Students enrolled in aviation coursework will be required to complete tasks and meet standards required by aviation careers associated with the coursework.

**RESOURCES (Technology Based Resources, Text Resources, etc.):**

FAA -Instrument Rating – Airplane: Airman guidelines  
 G1000 Flight simulators  
 E6B / Foreflight  
 Charts and as associated documents necessary  
 WASA curriculum, exams, and stage checks

**KEY VOCABULARY:**

Students will learn, study, and practice appropriate information in the “Aeronautical Information Manual”; the air traffic control system and procedures for instrument flight operations, IFR navigation and approaches by use of navigation systems, use of IFR en route and instrument approach procedure charts, procurement and use of aviation weather reports and forecasts, and the elements of forecasting weather trends on the basis of that information and personal observation of weather conditions, Safe and efficient operation of aircraft under instrument flight rules and conditions, recognition of critical weather situations and windshear avoidance, aeronautical decision making and

judgment; and crew resource management, to include crew communication and coordination.

**Absolute Ceiling:** The highest altitude an aircraft can maintain while maintaining a constant airspeed.

**Accelerated Stall:** A stall that occurs higher than the published stall speed.

**ADF (Automatic Direction Finder):** A radio navigation system that identifies the relative bearing of an aircraft in relation to a non-directional radio beacon (NDB).

**Adiabatic Lapse Rate:** The rate of temperature change due to an increase or decrease in altitude.

**Adverse Aileron Yaw:** A yawing moment in the opposite direction of a turn created by aileron deflection and the subsequent difference in drag.

**Aeronautical Decision-Making:** The systematic approach to constantly determine the best decision in an aviation environment.

**Aeronautical Information Manual (AIM):** An official Federal Aviation Administration (FAA) publication that describes the correct procedures to be followed in the US.

**AGL (Above Ground Level):** The vertical distance between the aircraft and the ground.

**Aileron:** The movable, hinged flight control surfaces used to roll an aircraft.

**Airfoil:** The cross-sectional shape of a wing or similar surface, such as a blade, that produces lift.

**Airline:** A company that offers commercial flights on regularly scheduled routes.

**Airspace Class:** A type of airspace, defined by ICAO, with specific rules and use cases.

**Alfa: (Pronounced "Alpha")** The phonetic word used to refer to the letter "A."

**Airspeed Indicator (ASI):** An instrument that uses pitot-static pressure readings to indicate aircraft airspeed.

**Altimeter:** An instrument that measures the vertical distance between the aircraft and a fixed reference.

**AMT: Aviation Maintenance Technician, i.e.,** an aircraft mechanic.

**AME: Aviation Medical Examiner, i.e.,** a doctor specializing in aviation medicine.

**The angle of Incidence:** The angle between the chord line of an airfoil and the longitudinal axis of an aircraft.

**The angle of Attack:** The angle between the relative airflow and the chord line of an airfoil.

**Anhedral:** The downward sloping angle of a wing.

**Apron:** A paved area designated for aircraft parking and movement.

**Approach:** The phase of flight before landing.

**ATIS: Automatic Terminal Information Service,** a continuous broadcast of weather and operational information, usually on a VHF radio-frequency.

**Avionics Master Switch:** A switch that engages or disengages the electrical power for the aircraft's avionics.

**Blade Angle:** The angle between the propeller blade's reference line and the axis of rotation.

**Bleed Air:** Hot compressed air from the compressor stage of an engine.

**Bravo:** The phonetic word used to refer to the letter "B."

**Cabin Crew:** The airline staff members aboard an aircraft, commonly used to refer to the flight attendants.

**Calibrated Airspeed:** Indicated airspeed corrected for position and instrument errors.

**Camber:** The curve of an airfoil.

**Cargo:** Items carried on board an aircraft.

**Center of Gravity (CG):** The point at which weight is evenly dispersed. In other words, the points through which the force of gravity effectively acts.

**Charter:** An aircraft that is rented out as a whole in contrast to a commercial flight where each seat is sold individually.

**Charlie:** The phonetic word used to refer to the letter "C."

**Chord Line:** A figurative straight line that runs between an airfoil's leading and trailing edges.

**Climb:** An increase in aircraft altitude.

**Cockpit:** Also known as the flight deck, this area of the aircraft contains the avionics and controls used by the pilots.

**C of A:** Refers to the Certificate of Airworthiness, a document akin to a car's registration document.

**Common Traffic Advisory Frequency (CTAF):** A radio frequency used for communication between aircraft at non-towered airports or outside of operating hours.

**Constant-Speed Propeller:** A propeller system designed to maintain a constant RPM by automatically varying the blade pitch.

**Contrail:** A white streak behind an aircraft caused by the rapid condensation of water vapor from an aircraft's jet stream.

**Course Deviation Indicator (CDI):** An instrument used to indicate lateral course deviation.

**Controlled Airspace:** Designated airspace managed by Air Traffic Control (ATC) services.

**Cross-Country:** A term generally used in the context of flight training; a cross-country flight is a flight away from the departure airport.

**Crosswind:** A wind blowing perpendicular (i.e., from left to right or vice versa) to the aircraft's track.

**Delta:** The phonetic word used to refer to the letter "D."

**Density Altitude (DA):** A measure of air density expressed as an altitude above Mean Sea Level (MSL).

**Descent:** The process of decreasing an aircraft's altitude.

**Distance Measuring Equipment (DME):** Equipment used to measure the slant distance between an aircraft and a ground station.

**Dogfight:** A short-range aerial battle between aircraft, often involving sharp maneuvers.

**Drag:** A force that opposes an aircraft's movement through the air.

**Downwind Leg:** A track parallel to and in the opposite direction of the runway intended for landing.

**EASA (European Aviation Safety Agency):** The European equivalent of the FAA (Federal Aviation Administration).

**Echo:** The phonetic word used to refer to the letter "E."

**Empennage:** The tail of an aircraft, usually consisting of a vertical and horizontal stabilizer.

**Elevator:** A horizontal surface that is used to control the aircraft in pitch.

**Estimated Time of Arrival (ETA):** The approximate time that you will arrive at a destination.

**Estimated Time of Departure (ETD):** The approximate time that you intend to depart your destination.

**Estimated Time en Route (ETE):** The approximate amount of time spent traveling between two points.

**Federal Aviation Administration (FAA):** A transportation agency regulating civil aviation in the United States.

**Federal Aviation Regulations (FARs):** The legislation governing civil aviation in the U.S.

**Fixed-Base Operator (FBO):** A company that provides aviation services such as fuel, parking, and hangar space at an airport.

**Feathering:** The act of reducing a propeller blade's pitch angle.

**Ferry Flight:** A flight intended to reposition an aircraft to a different airport.

**Final Approach:** The final phase of flight before landing.

**Firewall:** A fire-resistant barrier between the aircraft engine and its surrounding areas.

**Five by Five:** A phrase used to indicate that a radio transmission is clear on a scale from 1 to 5.

**Flaps:** Devices, typically located on the trailing edges of a wing, that are used to increase lift at lower airspeeds.

**Flare:** The final maneuver before an aircraft touches down where the nose is pointed upwards, and the descent rate is reduced.

**Flight Bag:** Used to carry useful documents and tools, such as headsets or checklists.

**Flight Computer:** A device, similar to a calculator, used to perform aviation calculations such as fuel consumption, speed, or wind direction.

**Flight Deck:** Also known as the cockpit, this area of the aircraft contains the avionics and flight controls used by the pilots.

**Flight Plan:** A document following a specific format, which includes information about a particular flight, such as the destination or aircraft type.

**First Officer (F/O):** The Second in Command (SIC) of the aircraft, also known as the copilot.

**Fog:** A thick cloud at or near the Earth's surface.

**Foxtrot:** The phonetic word used to refer to the letter "F."

**Flight Standards District Office (FSDO):** A local field office affiliated with the Federal Aviation Administration (FAA).

**Fuselage:** The central structure of the aircraft, intended for the flight crew, passengers, and cargo.

**General Aviation:** All civil aviation aircraft operations with the exception of commercial operations.

**Glass Cockpit:** Electronic, digital instrument displays, in contrast to analog-style gauges.

**Go-Around:** The process by which a landing attempt is abandoned.

**Golf:** The phonetic word used to refer to the letter "G."

**Gross Weight:** The total weight of an aircraft.

**Ground Effect:** A decrease in drag that occurs when an aircraft flies close to the ground.

**Groundspeed:** The horizontal speed of an aircraft relative to the ground directly below.

**Handoff:** The transferring of radar identification and radio communication of an aircraft from one controller to another.

**Handshake:** The initial greeting between two computers when a connection is established.

**Hangar:** A building used to store aircraft, typically located at an airport.

**Heavy:** A radiotelephony term for a large aircraft with a maximum takeoff weight of 136 tonnes (300,000 lb) or more.

**Horizontal Stabilizer:** The horizontal surface located at the back of the aircraft.

**Hotel:** The phonetic word used to refer to the letter "H."

**Hypoxia:** A condition caused by a lack of oxygen, posing a particular danger at high altitudes.

**ICAO (International Civil Aviation Organization):** An agency of the United Nations created to promote international civil aviation's safe and orderly development.

**Instrument Landing System (ILS):** A ground-based system that utilizes radio waves to guide an aircraft to a runway.

**Instrument Flight Rules (IFR):** The set of rules that govern flight with no outside visual reference.

**India:** The phonetic word used to refer to the letter "I."

**Indicated Airspeed (IAS):** The speed of an aircraft as displayed on an airspeed indicator.

**Instrument Meteorological Conditions (IMC):** Weather conditions that require pilots to fly by sole reference to instruments, such as cloud, fog, or rain.

**Jet:** An aircraft propelled by one or more jet engines.

**Joystick:** Also known as a flight stick, a joystick is an input device consisting of a vertical stick that pivots from a base.

**Juliet:** The phonetic word used to refer to the letter "J."

**Calibrated Airspeed in Knots (KCAS):** Indicated a speed corrected for instrument and position errors.

**Indicated Airspeed in Knots (KIAS):** Airspeed as indicated by the airspeed indicator.

**Kneeboard:** A small clipboard that is attached to the thigh.

**Knot:** 1 knot = 1 nautical mile per hour.

**True Airspeed in Knots (KTAS):** The airspeed of an aircraft relative to the air mass it is flying through.

**Kilo:** The phonetic word used to refer to the letter "K."

**Laminar Flow:** The smooth airflow over an aircraft's wing.

**Lift:** A force acting perpendicular to the oncoming airflow, and opposing weight.

**Lima:** The phonetic word used to refer to the letter "L."

**Load Factor:** Also known as g-force, the load factor is the ratio of the lift produced by an aircraft compared to its weight.

**Longitudinal Axis:** A horizontal direction from the aircraft's nose to its tail.

**Mach:** The ratio of an aircraft's speed to the speed of sound.

**Magnetic Compass:** An instrument that displays direction on the surface of the Earth through a magnetic pointer that is aligned with the Earth's magnetic field.

**Magnetic Deviation:** A magnetic compass error induced by local magnetic fields of aircraft materials.

**Magnetic North:** The location is indicated as north on a magnetic compass, in contrast to true (geographical) north.

**Magneto:** An isolated component of the engine ignition system that provides high voltage electricity to the spark plugs.

**Mean Sea Level (MSL):** The average level of the ocean's surface.

**METEorological Aerodrome Report (METAR):** A standard format for reporting weather information.

**Morse Code:** A method of representing letters of the alphabet and numbers by an arrangement of dots, dashes, and spaces.

**Maximum Take-Off Weight (MTOW):** The maximum weight allowed for takeoff. **Mike:** The phonetic word used to refer to the letter "M."

**Narrow-Body Aircraft:** A smaller aircraft with only one aisle inside the cabin.

**Non-Directional Beacon (NDB):** A low-frequency ground-based navigation aid.

**Notice to Airmen (NOTAM):** A notice filed to alert pilots of possible hazards or non-standard procedures along a particular route or location.

**November:** The phonetic word used to refer to the letter "N."

**Outside Air Temperature (OAT):** The temperature of the air around an aircraft that is unaffected by the aircraft itself.

**Operating Limitations:** Restrictions to certain operations as defined by the aircraft manufacturer, such as airspeed, weight, or altitude.

**Oscar:** The phonetic word used to refer to the letter "O."

**Payload:** The content carried by aircraft, excluding what is necessary for operation.

**Papa:** The phonetic word used to refer to the letter "P."

**Pilot in Command (PIC):** Also known as the captain, the Pilot in Command is the pilot responsible for the aircraft operation and the ultimate authority on board.

**Pilot Report (PIREP):** Weather reports made by pilots to Air Traffic Control (ATC).

**Pitch:** The tilting of the aircraft up or down, i.e., the nose and tail rising and falling.

**Pitot Tube:** A small tube situated parallel to the airflow is used to measure air pressure.

**Pilot's Operating Handbook (POH):** The aircraft flight manual.

**Primary Flight Display (PFD):** The primary avionics screen used by the pilots.

**Propeller:** A rotating blade that creates thrust by displacing air.

**Quadruplane:** An aircraft with four wings.

**Quick Access Recorder (QAR):** A flight data recorder intended to provide easy access to raw flight data.

**Quebec:** The phonetic word used to refer to the letter "Q."

**Roll:** The rotation of an aircraft about the longitudinal axis, running from the nose to the tail.

**Rudder:** A control surface, usually attached to the vertical stabilizer, used to control the aircraft in yaw.

**Runway (RWY):** A straight rectangular area used by aircraft for landing and takeoff.

Runway End Safety Area (RESA): A designated area beyond the end of a runway designed to be used in an emergency to stop an aircraft from overshooting.

Romeo: The phonetic word used to refer to the letter "R."

Short Field: A runway that is shorter in length than average.

Sideslip: The sideward movement of an aircraft in relation to the wind.

Skid: The sliding outward movement of an aircraft during a turn.

Slip: The sliding inward movement of an aircraft during a turn.

Squawk: A four-digit code provided by Air Traffic Control to be inputted into a transponder for aircraft identification.

Stall: A condition that causes a significant decrease in lift due to the aircraft exceeding the critical angle of attack.

Standard Rate of Turn (also known as a Rate 1 turn): A rate of turn of  $3^\circ$  per second ( $360^\circ$  in two minutes).

Straight and Level: Flight at a constant altitude and heading.

Sierra: The phonetic word used to refer to the letter "S."

Tail: The rear section of an aircraft.

Threshold: The first section of a runway designated with specific markings.

Throttle: A control in the cockpit is used to control the output of the engine.

Thrust: The force created by the engine(s) which opposes drag.

Torque: Rotational force.

Touch and Go: The act of landing and then taking off from a runway without stopping.

Transponder: A piece of equipment on an aircraft that outputs signals used by ATC for identification purposes.

Trim Tab: A small surface on the edge of a control surface intended to counteract aerodynamic forces on the control surface.

True Airspeed (TAS): The airspeed of the aircraft corrected for errors caused by altitude and temperature.

Turbulence: An abrupt change in airflow caused by atmospheric conditions.

Tower (TWR): A tall building where air traffic controllers work, providing optimal views of the airport.

Taxiway (TWY): The area of an airport used by aircraft to navigate to a runway or apron.

Tango: The phonetic word used to refer to the letter "T."

Upwind Leg: A flight path that runs parallel to the runway in the same direction of takeoff.

Useful Load: The content carried by aircraft in addition to its own weight, such as the pilots, passengers, and fuel.

Universal Time Coordinated (UTC): The standard used for time zones worldwide.

Uniform: The phonetic word used to refer to the letter "U."

V speed: A standard term used to describe specific airspeeds, such as  $V_{ne}$  (never exceed speed).

Vertical Speed Indicator (VSI): An instrument that indicates the rate of climb or descent.

Very High Frequency (VHF) Omni-Directional Range (VOR): A ground-based navigation aid used by aircraft to receive  $360^\circ$ -degree directional information.



Visual Flight Rules (VFR): Regulations that define aircraft operations using visual references.

VFR On Top: VFR conditions above a cloud layer.

Visual Metrological Conditions (VMC): Weather conditions that allow pilots to operate according to visual references.

Victor: The phonetic word used to refer to the letter "V."

Wide Body Aircraft: An aircraft with at least two aisles inside.

Windshear: An abrupt change in horizontal and/or vertical wind direction.

Wx: An abbreviation for "weather."

Whiskey: The phonetic word used to refer to the letter "W."

XC: An abbreviation for "cross-country."

X-Ray: The phonetic word used to refer to the letter "X."

Yaw: The rotation of the aircraft around its vertical axis.

Yoke: Also known as a control column, the yoke is used to move the control surfaces of the aircraft.

Yankee: The phonetic word used to refer to the letter "Y."

Zulu Time: The standard time zone used throughout the aviation and synonymous with UTC (Universal Coordinated Time).

Zulu: The phonetic word used to refer to the letter "Z."