AP 101- Introduction and Atmosphere

Recall the HF definition, its associated terminology, and scientific concepts.
Human Factors definition: optimize the relationship between people and their activities

SHELL:
- **Software**
- **Hardware**
- **Environment**
- **Liveware**
- **Liveware**

Throughout the entire course students will identify the HF challenges associated with USAF aviation and the human performance implications.
Human factors has accounted for majority of aviation accidents

Know the characteristics of the earth's atmosphere.
Pressure & Temperature

Recognize the functions of the atmosphere.
Air support, protects us radiation & space debris

Identify which gasses are present in the atmosphere and their associated percentage of the total composition.
78% Nitrogen, 21% Oxygen, 1% Other

Recall the common units of measurement for atmospheric pressure.
Pounds per Square Inch (psi)
Millimeters of Mercury (mmHg)
Inches of Mercury (inMg)

Recognize the description and common unit of measure of the U.S. Standard Atmosphere.
+15℃ and 760 mmHg (29.92 inHg)

Recognize the definition of the standard temperature lapse rate.
State the standard temperature lapse rate.
Decrease in temp as we increase in altitude
-2℃/1000 ft

List the physiological divisions of the atmosphere.
Physiological Zone (sea level to 10,000 ft)
Physiological Deficient Zone (10,000 ft to 50,000 ft)
Space Equivalent Zone (higher than 50,000 ft)

Recall partial pressure and identify its notation.
Portion of the total pressure that each gas contributes, and it's directly related to the gas's percentage in the mixture
Notation: PN, PO2, (P = partial wow!!)

Identify the gas laws & recall the physiological effects of each gas law
Dalton's Law:

- **The total pressure of a mixture of gases is equal to the sum of the partial pressures**
- **Explains how exposure to a high ambient altitude can reduce the available oxygen (percent of oxygen remains the same but there is less)**

Boyle's Law

- **When the temperature remains constant, the volume of gas is inversely proportional to the pressure surrounding it**
- **Why a balloon expands and pops as it goes up**
- **Explains effects of pressure in ears, sinuses, GI tract, and teeth**

Henry's Law

- **The amount of a gas in a solution varies directly with the partial pressure of that gas over the solution**
- **Carbon dioxide bubbles released when opening soda**
- **Nitrogen bubbles in body can lead to decompression sickness**

Ideal Gas Law

- **Describes gas behavior using temperature, pressure, and volume**
- **Example: tire has lower psi in winter months**

Gaseous Diffusion

- **A gas will diffuse from an area of higher concentration or pressure to an area of a lower concentration or pressure until equilibrium is reached**

AP 102 - Respiration and Circulation

Know the structures and functions of the respiratory system.
Intake, filtering and conditioning of air (warm and humidify)
Gas exchange
Temperature regulation
Metabolic function
Maintain acid-base balance (pH) of blood

Recall the phases of respiration.
Recall the functions of each structure in the respiratory system.
Ventilation - inhalation and exhalation of gas
Diffusion (1) - oxygen and carbon dioxide pass through the alveolar membrane and capillary walls into red blood cells
Transportation- oxygen is carried by the blood to the cell and tissue for utilization
Diffusion (2) - movement of gases between the blood, the interstitial fluid, and the cells
Utilization - oxygen is used to produce energy (resulting as carbon dioxide and water)

Identify structures that are important to respiration.
Identify the important factors in normal respiration.
Active component - inhalation
Passive component - exhalation
Diaphragm and lungs are used for respiration

Recall functions of the structures of the circulatory system.
Purpose: transports and distributes nutrients and oxygen to the tissues and removes waste products of metabolism, regulated body temp, etc

The heart: 4 chambers, two pumps
Blood vessels: Arteries, Veins, Capillaries
Red Blood Cells: transport oxygen and carbon dioxide

Identify factors affecting oxygen delivery to the tissue.
Altitude
G-Forces
Toxic Gases or Substances

AP 103 - Altitude Threats

Recall the definition of hypoxia.
Definition: Hypoxia is an oxygen deficiency sufficient to cause impairment to function

Recognize the potential characteristics of the onset of hypoxia.

- **May not recognize onset; this is very dangerous**

Recall the types of hypoxia and associated causes.
Hypoxic Hypoxia:

- **Caused by exposure to low barometric pressure (altitude hypoxia)**
- **Reduced oxygen partial pressure can occur from oxygen equipment malfunctions, improper use of oxygen equipment, and loss of cabin pressurization**

Hypemic Hypoxia:

- **The oxygen carrying capacity of the blood is reduced**
- **Caused by blood loss or blood donation**
- **CO poisoning**

Stagnant Hypoxia:

- **Occurs when reduction in cardiac output, pooling of blood, or restriction of blood flow reduces oxygen delivery**
- **Caused by hyperventilation or G-Force**

Histotoxic Hypoxia:

- **Results when the oxygen delivered to the cells cannot be used for energy reproduction**
- **Toxins, gases, and alcohol**

Identify the types of hypoxia with its symptoms.
Hypoxic Hypoxia:

- **Dizziness**
- **hot/cold flashes**
- **Tingling**
- **Tunnel vision**
- **Visual impairment**
- **euphoria/disphoria**

Hypemic Hypoxia:

- **Headache**

- **Fatigue/weakness**
- **Rapid breathing**
- **Blue coloration**

Stagnant Hypoxia:
- **Grey-out/black out**
- **cold/clammy skin**
- **Numbness**
- **Faintness**
- **Loss of vision**

Histotoxic Hypoxia:
- **Impaired coordination**
- **Confusion**
- **Slurred speech**
- **Drowsiness**

Identify factors that influence hypoxia
- **Altitude**
- **Rate of ascent**
- **Duration at altitude**
- **Exertion at altitude**
- **Individual tolerance**
- **Self-imposed stress**
- **medications/drugs**

Know how to both recognize and prevent hypoxic hypoxia.
Prevention: cabin pressurization, preflight oxygen equipment, PRICE check, proper use of oxygen equipment

Memorize the procedures to treat hypoxic hypoxia.
1. **Maximum Oxygen Under Pressure**
2. **Connections - Check Security**
3. **Breathe at a Rate and Depth Slightly Less Than Normal Until Symptoms Disappear**
4. **Descend Below 10,000 FT MSL and Land as Soon as Practical**

Know the definition, characteristics and causes of hypocapnia.
Definition: condition which the rate and depth of breathing is abnormally increased (causes large loss of carbon dioxide)

Emotional causes: fear, anxiety, stress, tension, etc.

Recall the signs and symptoms of hypocapnia.
Increased rate of breathing, muscle tightness and twitching, paleness, cold clammy skin, muscle spasms

Memorize the procedures to treat hypocapnia.
Immediate oxygen

Recall the similarities of treatment for hypocapnia, hypoxia, and other physiological symptoms.
GREEN RING - PULL (AS REQUIRED)
DESCENT BELOW 10,000 FEET MSL - INITIATE
OBOGS SUPPLY LEVER - PULL (BOTH)

Identify the basic cause of trapped gas disorders.
Changes in ambient pressure during flight will result in in changes in the volume of body gases

Identify the areas of the body most likely to be affected by trapped gases and when it is most likely to occur.
Descending:
- **Ears, sinuses**

Climbing:
- **GI tract, teeth**

Identify the various trapped gas disorders.
Ear block: sharp ear pain, hearing loss
Sinus block: facial pain, headache
GI tract gas expansion: bloating, cramps
Tooth squeeze: sharp local tooth pain
Face/Mask block: bruising, eye redness

Memorize how to treat and prevent trapped gas disorders.
Pop ears, yawn, clear ears (valsalva), chew gum, descend to lower altitude

Identify the common types and causes of decompression sickness.
Identify the symptoms associated with each type of decompression sickness
Happens when nitrogen bubbles get stuck in your body/joints
- **The Bends: joint and muscle pain**

- **The Creeps: tingling, hot/cold sensation, numbness, pins and needles**
- **The Chokes: deep, sharp pain under sternum, dry nonproductive cough**
- **CNS (Central Nervous System) Manifestation: severe headaches and visual disturbances**

Recall the corrective actions for suspected decompression sickness.
Descend, immediate oxygen, immobilize affected area

Identify the impact various factors have on DCS incidence and severity.
Altitude & duration at altitude, rapid changing, physical activity

Recall risks concerning flying and SCUBA diving.
Getting decompression sickness holy fuck that is so retarded why is this so repetitive

List methods used to treat decompression sickness.
Oxygen dumb fuck and read three lines above

AP 104 - Cabin Pressurization

Know how aircraft pressurization affects aircrew members.
Reduces chance of hypoxia & depression sickness

Identify the different pressurization systems.
Isobaric & Isobaric Differential

Recall the advantages and disadvantages of pressurization systems.
Advantages:
- **Decreased risk of hypoxia and decompression sickness**
- **Comfort**
- **Cabin temperature**

Disadvantages:
- **Cabin decompression**
- **Need to minimize cabin contaminants**
- **Impact on aircraft performance**
- **Increased maintenance costs**

Recall the types of decompression and characteristics of each.
Isobaric:
- **heavies/commercial**

- **Maintain 8,000 feet of pressure**

Isobaric Differential:

- **Planes above 10,000 ft usually**
- **Control valve regulator regulates pressure to be within a certain amount**
- **T-6 is 3.6 +- 0.2**

Identify the physical indications of rapid decompression.

Rapid: 0.5 - 15 seconds

Physical indications:

- **explosive noise, fogging, decreased temp or pressure, wind blast/debris**

Physiological indications:

- **Ear pressure, gas expansion, individual hypoxia symptoms**

Identify the procedures for dealing with rapid decompression.

100% oxygen, pressure breathing, controlled descent

AP 105 - Vision

Memorize the function of each part of the eye discussed.

Retina - allows us to see

Optic Disk - anatomical blind spot

Rods - peripheral vision, nighttime

Cones - color vision

Fovea - part of the retina, nighttime blind spot, best color vision & max visual acuity

Recognize the physiological blind zones associated with parts of the eye.

Optic Disk - blind spot because it has no rods or cones

Fovea - blind spot at night due to high density of cones

Know the characteristics of the visual field.

Ambient (Peripheral) & Focal (Central)

Identify the characteristics of both focal and peripheral vision.

Focal Vision:

- **Cones, depth perception, 20/20 acuity**

Peripheral Vision:

- **Rods, poor visual acuity, subconscious processing of information, balance and orientation**

Identify the limitations of focal and peripheral vision.
Visual contrast, shapes of targets, movements of targets, environmental conditions

Know the limitations and visual illusions associated with daytime flight.
False Horizon, Autokineses, Runway Width Illusion

Recognize how visual contrast, target shape, target movement, environmental conditions, and empty-field myopia limit the ability to perceive objects in the visual field.
Makes objects harder to detect

Identify the effect that perception/reaction time, visual acquisition, and scanning have on midair collision avoidance.
Delays increase collision risk, poor acquisition = late detection, improper scanning = missed targets

Identify the correct scanning technique used to avoid midair collisions.
Daytime: Z
Nighttime: Diamond

Select measures you can take to ensure maximum visual acuity in both day and night flying conditions.
Stay hydrated, minimize eye straight, sleep well, adjust to night vision (red light), use proper scanning techniques

Recall techniques to maximize visual acuity.
Manage lighting and glare, use proper scanning techniques, dark adaption, basically the same shit I just wrote

Identify methods to prevent visual illusions.
Beware of environmental conditions, cross check, rely on training

Know the characteristics of lasers and associated actions upon exposure.
Lasers produce concentrated, coherent light that can cause temporary flash blindness or retinal damage, and immediate actions include averting eyes, shielding, and avoiding staring at the beam.

Recall the hazards associated with laser exposures.
Flash blindness, glare, retinal burns, temporary visual impairment, and distraction leading to loss of situational awareness

Identify the correct procedures to take upon exposure to lasers in-flight.
Immediately avert eyes, maintain aircraft control, avoid looking directly at the beam, and use instruments to continue flight safely.

Identify the correct reporting procedures after exposure to lasers.
L - Location of the source
A - Appearance
S - Scanning or Tracking
E - Effects
R - Regularity

AP 106 - Night Vision

Apply threat mitigation techniques with regard to low light conditions.
Use red cockpit lighting, maintain dark adaptation, employ off-center viewing, scan systematically, and rely on instruments to reduce visual hazards at night.

Identify dark adaptation's influence on night vision.
Dark adaptation allows the eyes to increase sensitivity to low light, improving the ability to detect objects and hazards at night.

Demonstrate methods used to prevent the autokinesis illusion.
Avoid staring at a single light for more than a few seconds and use off-center viewing or reference points to maintain accurate perception of motion.

Identify how flash blindness produces debilitating effects on dark adaptation.
Flash blindness temporarily overwhelms the retina with bright light, destroying night vision and delaying dark adaptation, sometimes for several seconds to minutes.

Identify the reduction in visual acuity, loss and shift of color perception, focal and peripheral vision degradation.
Low light causes reduced visual acuity, loss or shift of color perception, and degradation of both central (focal) and peripheral vision.

AP 107 - Situational Awareness

Know the fundamentals of AMT and SA.

Identify the two primary types of information processing.
Conscious & subconscious

Outline the levels and components of SA.
Perception, Comprehension, Projection

Recall SA theory and its implications on operations.
Effective decision-making depends on perceiving, understanding, and predicting elements in the environment

Comprehend the causes of a loss of situational awareness
Result from task saturation, distraction, fatigue, poor communication, high workload, inadequate training, and misinterpretation of cues

Identify the predominant causes of the loss of situational awareness (LSA).
Distraction, fixation, high workload, fatigue, complacency, poor communication, and incomplete or inaccurate information.

Identify predominant attention management limitations and their impact on SA.
Tunnel vision, task saturation, distraction, and divided attention reduce perception of critical cues, impair comprehension, and degrade overall situational awareness.

Give examples of current mishaps which involve attention management and LSA as either casual or contributory.
No

Know the characteristics of SA by identifying how to recognize, prevent, and treat a loss of situational awareness.
Perceiving, comprehending, and projecting environmental elements
A loss can be recognized by confusion or missed cues, prevented through scanning, prioritization, and communication, and treated by regaining focus, reducing workload, cross-checking instruments, and seeking assistance if needed.

Identify methods to improve SA and attention management.
Systematic scanning, task prioritization, workload management, effective communication, anticipating threats, using automation wisely, and maintaining alertness and focus.

Identify cues for preventing and recognizing a loss of situational awareness.
Cues include confusion, missed or delayed responses, tunnel vision, task saturation, unexpected deviations from planned flight path, and inconsistent instrument readings, which signal the need to scan, communicate, and reassess the situation.

Identify mechanisms to recover from LSA.
Reducing workload, reestablishing a scan of instruments and environment, prioritizing tasks, communicating with crew, and using checklists or automation to regain orientation and control.

AP 108 - Spatial Disorientation

Know the characteristics of spatial disorientation.
Know the threats and impacts of the different types of spatial disorientation.
Definition: The inability to accurately orient yourself with respect to the horizon.

3 Types of Spatial Diorientation:

Type I: Unrecognized (most dangerous, relying on vestibular and somatosensory instead of instruments

Type II: Recognized (can cross check)

Type III: Incapacitating (so disoriented that you are incapable of recovery, even if it it recognized)

List four sensory systems used in orientation.

1. **Visual (eyes)**
2. **Vestibular (ears - semicircular canals and odolith organs)**
3. **Somatosensory (tactile pressure sensors)**
4. **Auditory (hearing surroundings)**

Define the relationship of the sensory systems to spatial disorientation.
The visual system, the vestibular system, the somatosensory system and the auditory system can all be "fooled" into believing what they sense is "true and accurate" in the flying environment. If the input from each system agrees with the others, the individual is "oriented." However, if there is a mismatch between the systems, the individual becomes disoriented, motion sick or both.

Select the sensory system providing the strongest, and usually the most reliable, orientation information.
Visual

Describe the vestibular system.
Located in the ear, reliable on the ground but fooled in the air. Made up of odolith organs and semicircular canals

Define the relationship of the vestibular system and the two subsystems: semicircular canals and the otolith organs.
Semicircular Canals - three canals in each ear, measure angular acceleration caused by head turning or tilting
Odolith Organs - little hair cells in your ears that detect horizontal acceleration

Determine the reason for the somatosensory system's unreliability in-flight.
Useless in the absence of correct visual cues. Because most movements are in positive G, there are no variations in pressure cues.

Recall the location of tactile pressure receptors of the somatosensory system.
Skins, muscles, tendons, joints

Describe the somatosensory system's function in-flight.
The somatosensory system does not receive adequate input to tell the somatosensory receptors if the aircraft is in a bank, nose up, nose down or inverted attitude.

Know the characteristics of the types of vestibular induced spatial disorientation.
Identify the cause of each somatogyral illusion.
Somatogyral Illusions

- **The Leans**
  - **most common, incorrect feeling of bank**
  - **caused when the semicircular canal responsible for sensing acceleration in the roll axis is stimulated.**

- **The Graveyard Spin/Spiral**
  - **poor visibility/instrument conditions, constant rate spin, adapts and think you aren't spinning anymore**
- **The Coriolis Illusion:**
  - **tumbling feeling, occurs when 2 or more semicircular canals are stimulated**
  - **turning rolling or changing pitch and crew member moves head out of plane of motion**
- **Nystagmus:**
  - **repetitive eye reflex (shaking) that affects vision**

Recognize the cause of somatogravic illusions.
Caused by linear accelerations (odolith organs)

Know the factors affecting spatial disorientation.
List items affecting environmental and physiological factors of spatial disorientation.
Environmental

- **Weather**
- **Mission type & duration**

Physiological

- **Alcohol, self medication, dehydration, fatigue, experience, preparation**

Identify other factors that affect SD.
Experience in flying in IMC conditions, mission preparation, and your recency of experience (how long ago you flew in these conditions).

Recall 5 methods used to prevent spatial disorientation.

- **Understand limitations**
- **Remedy correctable factors**
- **Use capabilities properly**
- **Recognize high risk situations**
- **Stay alert**

List 7 procedures used to overcome spatial disorientation.

- **Transition to instruments**
- **Believe the instruments**
- **Back up the pilot flying on instruments**
- **Minimize head movements**
- **Fly straight and level**
- **Be prepared to transfer/assume control**
- **Egress**

Know the causes of and techniques to prevent/overcome motion sickness in flight.
Identify the most widely accepted theory of the cause for motion sickness.
Identify techniques to help prevent and/or treat motion sickness.
Causes: conflict between the visual and vestibular system or between different components of vestibular system
Prevent/Overcome: use outside references, hydrate, eat, eliminate self imposed threats, cool air, nose breathing

AP 109 - Barany Chair

Using a Barany Chair, trainees will accomplish instructor-directed physical maneuvers to gain a practical understanding, and recognition of visual and vestibular limitations and their susceptibility to error.

Recognize and become familiar with the following illusions: Graveyard Spin/Spiral, Nystagmus, and Coriolis.

Observe how other trainees respond to illusions to better understand the effects of SD and the various physiological responses to SD illusions.

AP 110 - Noise and Vibration

Know the characteristics of noise.
List the characteristics of noises that affect hearing.
Recall the definitions and units of measure of frequency, intensity, and duration.

- **Frequency (Hz, higher frequency = higher pitch)**
- **Intensity (dB, higher amplitude = higher sound)**
- **Duration (time)**

Define noise.
Definition: unwanted sound

Know the effects of hazardous noise on hearing capability.
List types of hearing loss associated with high intensity noise.

- **Conductive hearing loss**
    - **Loss occurs when one of the parts of the ear that is designed to transmit mechanical energy fails.**
- **Sensorineural hearing loss**
    - **Occurs when the hair cells of the cochlea are damaged, destroyed, or degenerated due to overexposure to noise.**

Note:

Temporary threshold shift: A nonpermanent loss of hearing in a frequency or range of frequencies after exposure to loud noise.

Permanent threshold shift: Occurs when the cochlea's ability to convert a certain frequency or frequencies to electrical signals is lost because of hair cell damage.

Identify the potential nonauditory effects of noise on crewmembers' in-flight performance.

- **Make speech unintelligible**
- **Misinterpretation of communication**
- **Increased stress**
- **Increased fatigue**
- **Irritability, distraction, uncooperativeness**

Know the protective measures used to minimize hazardous noise exposure.
List devices that help minimize hazardous noise.
Describe techniques for minimizing hazardous noise exposure.
Earplugs, ear defenders, headsets, flight helmets, reduce exposure time, combination of protective devices is best, create space from noise

Know the potential effects of prolonged exposure to aircraft vibration.
Reaction time, visual impairment, fatigue

Recall the definition of vibration.
Definition: rapid movement of an object in a back and forth motion

- **Frequency, intensity, duration**

Identify how vibration energy is passed through the body.
Acoustically or by direct mechanical linkage

Describe symptoms of vibration exposure.
Loss of appetite, complacency, sweating, salivation, nausea, headache. vomiting

AP 111 - Acceleration

Identify the three types of acceleration.
Linear, Radial, Angular

Identify the three types of G force.
Transverse, Negative, Positive

Recall the definition of each type of G force.
Transverse: Gx, Front to Back
Negative, Gy, Side to Side
Positive, Gz, Up & Down

Identify the physical symptoms associated with each type of G force.
Transverse:

- **Blood pooling in chest/abdomen, possible difficulty breathing, mild gray-out, and pressure on internal organs**

Negative:

- **Produces "red-out," headache, facial swelling, congestion in head/eyes, and possible nausea due to blood rushing to the head.**

Positive:

- **Causes gray-out, tunnel vision, loss of peripheral vision, blackout, and potential G-LOC as blood drains from the brain to the lower body.**

Know the characteristics of the factors that determine the effects of G forces on a crewmember's body.
Physical:

- **Magnitude of G Force**
- **Duration of exposure of G Force**
- **Rate of application (G Onset)**
- **Direction of force**
- **Previous G exposure**

Physiological:

- **Mobility**
- **Cardiovascular reflex**
- **Visual**
- **Vestibular**

Recognize what causes blackout and how it is different than G-induced loss of consciousness (G-LOC)
Blackout occurs when vision is lost due to reduced blood flow to the eyes while consciousness is maintained, whereas G-LOC is complete loss of consciousness caused by insufficient blood flow to the brain during high positive Gs.

Know the characteristics of G-LOC.
Absolute Incapacitation & Relative Incapacitation

Describe the symptoms of each of the phases of incapacitation.

Absolute Incapacitation:

- **Unconscious for 9-21 seconds (avg 15 sec)**
- **Involuntary skeletal muscle contractions and spasms just before regaining consciousness**

Relative Incapacitation:

- **Regain consciousness, having mental confusion, disorientation, memory loss**
- **Incapable of flying aircraft, making decisions, etc.**

Explain the impact of relative incapacitation on the total time required to regain control of the aircraft after G-LOC.

After G-LOC, relative incapacitation - reduced cognitive and motor function following recovery of consciousness - delays the pilot's ability to assess the situation and regain full control, extending the total time needed to safely stabilize the aircraft.

Know the methods used to help prevent G-LOC.

Anti-G Suit
Anti-G Straining Maneuver

Identify methods to increase G tolerance.

Anti-G Suit
Anti-G Straining Maneuver
Physical fitness, lower body muscle, hydration, avoid fatigue

Recall G-suit function and level of protection provided.

A G-suit inflates around the legs and abdomen to prevent blood from pooling in the lower body, helping maintain cerebral blood flow and extending positive G tolerance by several seconds.
1-1.5 G

Identify the elements involved in correctly performing the AGSM.

The AGSM involves a coordinated sequence of a strong, continuous muscle strain (legs, glutes, and abdomen) combined with timed, forceful exhalation against a closed glottis to maintain blood pressure and cerebral perfusion.

Recall errors involved in performing the AGSM.
Frequent errors include insufficient muscle tension, improper timing of the breathing cycle, shallow or rapid breaths, incomplete glottis closure, and loss of coordination between strain and exhalation.

Identify common mission characteristics that are likely to cause AGSM errors.
High workload, prolonged high-G maneuvers, unexpected or rapidly changing G onset, complex cockpit tasks, and fatigue increase the likelihood of improper or inconsistent AGSM performance.

Know the characteristics of the methods used to increase a crewmember's tolerance to positive G-forces and recall physiological factors related to increased performance in a positive G force environment.
Methods include physical conditioning, proper nutrition and hydration, anti-G straining maneuvers (AGSM), and use of a G-suit, all of which enhance cardiovascular performance, maintain cerebral perfusion, and delay visual and cognitive symptoms of high positive Gs.

Recognize the role self-imposed stressors play in decreasing G force tolerance.
Self-imposed stressors like fatigue, dehydration, anxiety, heavy meals, illness, or lack of sleep reduce cardiovascular efficiency and muscular performance, thereby lowering tolerance to positive G-forces.

AP 112 - Performance Threat Managements

Know the aircrew performance effects over-the-counter (OTC) drug use.

Identify the types of OTC medications and nutritional supplements.
Decongestants, Antihistamines, Vasoconstrictors, Pain Killers, Diet Pills

Recognize the potential performance effects of nutritional supplements and OTC medications.
Impair alertness, reaction time, judgment, coordination, or cardiovascular performance, potentially reducing flight safety and tolerance to physiological stressors like G-forces.

Memorize Air Force policy on OTC medications and nutritional supplements.
No

Know the aircrew performance effects of alcohol use.
Identify both the immediate and residual effects of alcohol on the body.

Impairs judgment, coordination, reaction time, cognitive processing, and decision-making, and can exacerbate fatigue and dehydration, **all of which degrade flight performance and safety**.

Memorize Air Force policy concerning alcohol consumption by crewmembers.
12 hours bottle to throttle - including after effects

Know the aircrew performance effects of smoking and chewing tobacco use.
Recall the immediate and residual effects of smoking and smokeless tobacco.
Tobacco use reduces cardiovascular and pulmonary efficiency, increases heart rate and blood pressure, impairs oxygen delivery, and can contribute to fatigue and decreased G-force tolerance, negatively affecting overall flight performance.

Recall the physiological effects of Carbon Monoxide.
CO binds to hemoglobin more strongly than oxygen, reducing oxygen delivery to tissues, causing headache, dizziness, impaired judgment, fatigue, visual disturbances, and, at high levels, loss of consciousness or death

Know the aircrew performance effects of both poor and proper diet and nutrition.
A poor diet can cause fatigue, reduced cognitive function, slower reaction time, and decreased G-force tolerance, whereas a proper diet supports sustained energy, alertness, mental performance, and physiological resilience during flight.

Identify the effects of hypoglycemia.
Hypoglycemia causes fatigue, weakness, dizziness, impaired judgment, confusion, blurred vision, tremors, and in severe cases, loss of consciousness, all of which degrade flight performance.

Memorize hypoglycemia prevention methods.
Prevent hypoglycemia by eating regular balanced meals and snacks, maintaining proper hydration, monitoring blood sugar if diabetic, and avoiding skipping meals before or during flight.

Recognize the signs and symptoms associated with dehydration.
Dehydration causes thirst, dry mouth, headache, dizziness, fatigue, decreased concentration, dark urine, and reduced sweating.

Memorize dehydration prevention methods.
Prevent dehydration by drinking adequate water before and during flight, avoiding excessive caffeine or alcohol, and monitoring urine color.

Know the aircrew performance effects of both acute and chronic fatigue:
Fatigue reduces alertness, reaction time, decision-making, memory, coordination, and overall mission effectiveness.

Recall definition of both chronic and acute fatigue.
Acute fatigue is short-term tiredness from extended activity or sleep loss, while chronic fatigue is long-term persistent tiredness from repeated sleep deprivation or sustained stress.

Identify the causes (scenarios) of acute and chronic fatigue.
Acute fatigue results from long missions, extended duty periods, or sleep loss, whereas chronic fatigue arises from repeated long flights, night operations, lifestyle issues, or cumulative sleep debt.

Memorize fatigue countermeasures.
Counter fatigue with adequate sleep, napping, proper nutrition, hydration, workload management, and circadian rhythm planning.

Identify both the advantages and disadvantages of GO/NO-GO Pill usage.
GO/NO-GO pills can temporarily reduce fatigue and maintain alertness, but may mask sleep needs, impair judgment, or cause rebound fatigue.

Know the aircrew performance effects of caffeine usage.
Caffeine increases alertness, reaction time, and wakefulness, improving short-term performance.

Recall both the negative and positive effects of caffeine on the body.
Positive effects include enhanced vigilance, mental performance, and physical endurance, while negative effects include jitters, insomnia, increased heart rate, dehydration, and anxiety.

Recognize hypercaffeination effects, post-usage and withdrawal threats
Hypercaffeination can cause nervousness, palpitations, and tremors, and abrupt cessation leads to headache, fatigue, irritability, and reduced cognitive performance.

Recall strategic caffeine consumption tactics.
Use caffeine moderately, timed for peak alertness, avoid late intake, and combine with rest and nutrition.

Know the aircrew performance effects of thermal stress.
Thermal stress reduces cognitive function, reaction time, endurance, coordination, and increases fatigue and dehydration risk.

Identify impacts to performance resulting from hot/cold stress.
Heat causes dehydration, heat exhaustion, and impaired decision-making, while cold causes slower reactions, numbness, reduced dexterity, and impaired judgment.

Recall thermal stress countermeasures.
Counter thermal stress by hydration, proper clothing, acclimatization, cockpit climate control, and workload management.

Identify the exacerbating effects thermal stress causes on the other physiological threats.
Thermal stress increases fatigue, dehydration, hypoxia susceptibility, and cardiovascular strain, compounding other flight risks.

Know the aircrew performance effects of stress
Stress reduces attention, situational awareness, decision-making, and increases risk of error.

Recall "overload" and ways to reverse the effects it has on the flying environment.
Overload is excessive task or information demand, and can be reversed by task prioritization, delegation, taking breaks, and effective workload management.

Identify common stressors to everyday life that can affect the flying environment
Stressors include personal issues, sleep disruption, work pressures, environmental hazards, and interpersonal conflict.

Recall lifestyle changes that can decrease the negative effects of stress.
Adopt regular exercise, proper sleep, balanced diet, mindfulness, and time management.

Recall stress countermeasures and stress management methods.
Manage stress through planning, relaxation techniques, task prioritization, communication, controlled breathing, and support from peers or supervisors.

AP 113 - Oxygen Equipment

Know the five types of oxygen storage and the two types of oxygen delivery systems.

- **Low Pressure Gas (yellow cylinders)**
- **High Pressure Gas (green cylinders)**

- **Liquid Oxygen (LOX, empty at 10% full at 95% *gas laws*)**
- **Solid State (chemical reaction)**
- **OBOGS (ON BOARD OXYGEN GENERATING SYSTEM)**

Describe the characteristics of the two types of oxygen delivery systems.
- **Continuous Flow**
- **Pressure Demand**

Describe the operational and emergency ceilings of the pressure demand regulator.
The pressure demand regulator provides adequate oxygen delivery up to 40,000 feet for normal operations and can function in emergency conditions up to 50,000 feet.

Know the functions and components of the T-6 On-Board Oxygen Generating System (OBOGS).
- **Oxygen Supply Lever**
- **Oxygen Concentration Lever**
- **Oxygen Pressure Lever**
- **OBOGS annunciators**
- **Regular BIT button**
- **Oxygen Flow Indicator**

Describe the functions of the OBOGS panel regulator.
Controls oxygen concentration, regulates flow to the mask, monitors system pressure and temperature, and provides switches for normal, emergency, or test modes

Describe the characteristics of the emergency oxygen systems.
Provide immediate supplemental oxygen during cabin depressurization or regulator failure, are independent of the main system, and deliver oxygen at a higher flow rate to maintain consciousness at high altitudes.

Know the components of MBU-20A/P oxygen masks, the emergency oxygen system, and how to perform an operational check of the oxygen system.
- **High Pressure Gas**
- **100% Oxygen for first 2-4 min**
- **Use when normal fails/is depleted/contaminated/egress**
- **Cylinder (left side of ejection seat)**
- **Manual Control (pull green ring)**

Identify the components of the MBU-20A/P oxygen masks.
- **3 pin connector**
- **Breathing hose**

- **Communication cord**
- **Microphone assembly**
- **PBG bladder supply hose**
- **Exhalation valve**
- **Keeper**
- **Inhalation valve**
- **Faceform**
- **Bayonets**
- **Hardshell**
- **Quick disconnect, mini male**

Identify the component parts of emergency oxygen systems.
The oxygen cylinder, pressure regulator, delivery hose, mask assembly, and activation mechanism (manual or automatic)

Describe the procedures necessary to perform a Regulator — Indicator — Connections — Emergency (RICE) check.

Describe the proper care of the mask and helmet.

Using a functional oxygen regulator, mask, and helmet, practice:
(1) Operating the regulator
(2) Donning and doffing the mask and helmet
(3) Performing a RICE check
(4) Breathing on the regulator
(5) Pressure breathing
(6) Speaking while pressure breathing