Aircraft Pilot Training II

8732 36 weeks / 280 hours

Table of Contents

Acknowledgments ......................................................................................................................................... 1
Course Description........................................................................................................................................ 2
Task Essentials Table.................................................................................................................................... 2
Curriculum Framework ............................................................................................................................... 10
Understanding Aircraft Performance ........................................................................................................ 10
Exploring Aeromedical Issues .................................................................................................................... 22
Examining Atmospheric and Meteorological Conditions ........................................................................... 37
Operating the Aircraft ................................................................................................................................. 54
SOL Correlation by Task ............................................................................................................................ 72
Appendix: Credentials, Course Sequences, and Career Cluster Information ............................................. 78

Acknowledgments

The components of this instructional framework were developed by

Charles L. Ullestad, Lt. Col. USAF (ret.), Aviation Instructor, Denbigh High School, Newport News Public Schools

Correlations to the Virginia Standards of Learning were reviewed and updated by:

Leslie R. Bowers, English Teacher (ret.), Newport News Public Schools
Vickie L. Inge, Mathematics Committee Member, Virginia Mathematics and Science Coalition
Anne F. Markwith, New Teacher Mentor (Science), Gloucester County Public Schools
Michael L. Nagy, Social Studies Department Chair, Rustburg High School, Campbell County Public Schools

The framework was edited and produced by the CTE Resource Center:

Nathan K. Pope, Writer/Editor
Kevin P. Reilly, Administrative Coordinator
Course Description

Suggested Grade Level: 11 or 12

Prerequisites: 8731

Students continue to participate in flight training, ground school, and simulator instruction to support the flight syllabus while studying meteorology, aerodynamics, navigation, physiology, airfield and flight environments, aircraft maneuvers, and aircraft weight and balance.

As noted in Superintendent's Memo #058-17 (2-28-2017), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

Task Essentials Table

- Tasks/competencies designated by plus icons (➕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (籥) are optional
- Tasks/competencies designated by minus icons (➖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Tasks/Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>8732</td>
<td>Understanding Aircraft Performance</td>
</tr>
<tr>
<td>39</td>
<td>➕ Calculate airspeed.</td>
</tr>
<tr>
<td>Task Number</td>
<td>8732</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>40</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Task Number</td>
<td>8732</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>60</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td></td>
</tr>
<tr>
<td>62</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td></td>
</tr>
<tr>
<td>67</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>

Exploring Aeromedical Issues

<table>
<thead>
<tr>
<th>Task Number</th>
<th>8732</th>
<th>Tasks/Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td></td>
<td>Define <em>aeronautical decision-making</em> (ADM).</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>Describe critical phase of flight.</td>
</tr>
<tr>
<td>71</td>
<td></td>
<td>Describe oxygen requirements.</td>
</tr>
<tr>
<td>72</td>
<td></td>
<td>Describe the physiological effects of altitude.</td>
</tr>
<tr>
<td>73</td>
<td></td>
<td>Describe effects of carbon monoxide poisoning.</td>
</tr>
<tr>
<td>74</td>
<td></td>
<td>Describe aeromedical factors related to fitness for flight.</td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>Describe aeromedical factors related to scanning procedures.</td>
</tr>
<tr>
<td>76</td>
<td></td>
<td>Describe the effects of hazardous ADM.</td>
</tr>
<tr>
<td>77</td>
<td></td>
<td>Describe human factors that affect ADM.</td>
</tr>
<tr>
<td>78</td>
<td></td>
<td>Describe the effects of alcohol on the body.</td>
</tr>
<tr>
<td>Task Number</td>
<td>8732</td>
<td>Tasks/Competencies</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>--------------------</td>
</tr>
<tr>
<td>79</td>
<td></td>
<td>Describe the effects of stress on the body.</td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>Describe human behavior with regard to dangerous tendencies.</td>
</tr>
<tr>
<td>81</td>
<td></td>
<td>Describe human behavior with regard to defense mechanisms.</td>
</tr>
<tr>
<td>82</td>
<td></td>
<td>Describe a pilot’s healthy response to external pressure.</td>
</tr>
<tr>
<td>83</td>
<td></td>
<td>Describe self-fulfillment with regard to the career of a pilot.</td>
</tr>
<tr>
<td>84</td>
<td></td>
<td>Describe the role of judgment in ADM.</td>
</tr>
<tr>
<td>85</td>
<td></td>
<td>Describe stress management.</td>
</tr>
<tr>
<td>86</td>
<td></td>
<td>Describe in-flight illusions.</td>
</tr>
<tr>
<td>87</td>
<td></td>
<td>Describe the learning process (levels of learning, transfer of learning, and incidental learning).</td>
</tr>
<tr>
<td>88</td>
<td></td>
<td>Describe the learning process as related to physical skills.</td>
</tr>
<tr>
<td>89</td>
<td></td>
<td>Describe laws of learning elements.</td>
</tr>
<tr>
<td>90</td>
<td></td>
<td>Describe oxygen systems.</td>
</tr>
<tr>
<td>91</td>
<td></td>
<td>Describe the need for oxygen system inspection.</td>
</tr>
<tr>
<td>92</td>
<td></td>
<td>Describe hyperventilation as related to cabin pressure.</td>
</tr>
<tr>
<td>93</td>
<td></td>
<td>Describe hypoxia.</td>
</tr>
<tr>
<td>94</td>
<td></td>
<td>Describe the physiological effects of scuba diving and flying.</td>
</tr>
<tr>
<td>95</td>
<td></td>
<td>Describe the threat of hyperventilation to pilots.</td>
</tr>
<tr>
<td>96</td>
<td></td>
<td>Describe concerns related to night vision.</td>
</tr>
<tr>
<td>97</td>
<td></td>
<td>Define spatial disorientation.</td>
</tr>
<tr>
<td>Task Number</td>
<td>8732</td>
<td>Tasks/Competencies</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>-------------------</td>
</tr>
<tr>
<td>98</td>
<td></td>
<td>Describe positive exchange of flight controls.</td>
</tr>
<tr>
<td>99</td>
<td></td>
<td>Describe regulations related to the use of narcotics, drugs, and intoxicating liquor.</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>Describe considerations related to prescription and over-the-counter drugs.</td>
</tr>
<tr>
<td>101</td>
<td></td>
<td>Describe regulations related to hazardous operations.</td>
</tr>
<tr>
<td>102</td>
<td></td>
<td>Describe dehydration and heat stroke.</td>
</tr>
</tbody>
</table>

**Examining Atmospheric and Meteorological Conditions**

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Tasks/Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>Define <em>atmospheric adiabatic process</em>.</td>
</tr>
<tr>
<td>104</td>
<td>Define <em>ceiling</em>, according to the FAA.</td>
</tr>
<tr>
<td>105</td>
<td>Interpret a weather report.</td>
</tr>
<tr>
<td>106</td>
<td>Interpret constant pressure chart and isotachs chart.</td>
</tr>
<tr>
<td>107</td>
<td>Interpret analysis heights and temperature chart.</td>
</tr>
<tr>
<td>108</td>
<td>Interpret information on a convective outlook.</td>
</tr>
<tr>
<td>109</td>
<td>Interpret information on a METAR/SPECI report.</td>
</tr>
<tr>
<td>110</td>
<td>Interpret information on a pilot weather report (PIREP).</td>
</tr>
<tr>
<td>111</td>
<td>Interpret information on a convective outlook chart.</td>
</tr>
<tr>
<td>112</td>
<td>Interpret information on a SIGMET.</td>
</tr>
<tr>
<td>113</td>
<td>Interpret information on a significant weather prognostic chart.</td>
</tr>
<tr>
<td>114</td>
<td>Interpret information on a surface-analysis chart.</td>
</tr>
<tr>
<td>115</td>
<td>Interpret information on a terminal aerodrome forecast (TAF).</td>
</tr>
<tr>
<td>Task Number</td>
<td>Number</td>
</tr>
<tr>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>116</td>
<td>8732</td>
</tr>
<tr>
<td>117</td>
<td></td>
</tr>
<tr>
<td>118</td>
<td></td>
</tr>
<tr>
<td>119</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
</tr>
<tr>
<td>121</td>
<td></td>
</tr>
<tr>
<td>122</td>
<td></td>
</tr>
<tr>
<td>123</td>
<td></td>
</tr>
<tr>
<td>124</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td></td>
</tr>
<tr>
<td>126</td>
<td></td>
</tr>
<tr>
<td>127</td>
<td></td>
</tr>
<tr>
<td>128</td>
<td></td>
</tr>
<tr>
<td>129</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td></td>
</tr>
<tr>
<td>131</td>
<td></td>
</tr>
<tr>
<td>132</td>
<td></td>
</tr>
<tr>
<td>133</td>
<td></td>
</tr>
<tr>
<td>134</td>
<td></td>
</tr>
<tr>
<td>135</td>
<td></td>
</tr>
<tr>
<td>Task Number</td>
<td>8732</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>136</td>
<td></td>
</tr>
<tr>
<td>137</td>
<td></td>
</tr>
<tr>
<td>138</td>
<td></td>
</tr>
<tr>
<td>139</td>
<td></td>
</tr>
<tr>
<td>140</td>
<td></td>
</tr>
<tr>
<td>141</td>
<td></td>
</tr>
<tr>
<td>142</td>
<td></td>
</tr>
<tr>
<td>143</td>
<td></td>
</tr>
<tr>
<td>144</td>
<td></td>
</tr>
<tr>
<td>145</td>
<td></td>
</tr>
<tr>
<td>146</td>
<td></td>
</tr>
</tbody>
</table>

Operating the Aircraft

<table>
<thead>
<tr>
<th>Task Number</th>
<th>8732</th>
<th>Tasks/Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>147</td>
<td></td>
<td>Describe special-use airspace.</td>
</tr>
<tr>
<td>148</td>
<td></td>
<td>Interpret information on a departure procedure (DP) chart.</td>
</tr>
<tr>
<td>149</td>
<td></td>
<td>Interpret information on a high altitude chart.</td>
</tr>
<tr>
<td>150</td>
<td></td>
<td>Interpret information on a low altitude chart.</td>
</tr>
<tr>
<td>151</td>
<td></td>
<td>Interpret information on a sectional chart.</td>
</tr>
<tr>
<td>152</td>
<td></td>
<td>Interpret information on a tower en route control (TEC).</td>
</tr>
<tr>
<td>153</td>
<td></td>
<td>Interpret information in U.S. chart supplements.</td>
</tr>
<tr>
<td>154</td>
<td></td>
<td>Interpret information on an airways chart.</td>
</tr>
<tr>
<td>Task Number</td>
<td>8732</td>
<td>Tasks/Competencies</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>---------------------</td>
</tr>
<tr>
<td>155</td>
<td></td>
<td>Interpret information on an instrument approach procedures (IAP) chart.</td>
</tr>
<tr>
<td>156</td>
<td></td>
<td>Describe IFR en route low altitude aeronautical charts.</td>
</tr>
<tr>
<td>157</td>
<td></td>
<td>Describe pilotage aeronautical charts.</td>
</tr>
<tr>
<td>158</td>
<td></td>
<td>Explain the difference between true north (TN) and magnetic north (MN).</td>
</tr>
<tr>
<td>159</td>
<td></td>
<td>Describe types of landing systems.</td>
</tr>
<tr>
<td>160</td>
<td></td>
<td>Describe VOR and NAV navigation systems.</td>
</tr>
<tr>
<td>161</td>
<td></td>
<td>Describe the pilotage method of navigation.</td>
</tr>
<tr>
<td>162</td>
<td></td>
<td>Describe airspeed indicators (ASIs).</td>
</tr>
<tr>
<td>163</td>
<td></td>
<td>Describe normal climb and descent rates.</td>
</tr>
<tr>
<td>164</td>
<td></td>
<td>Describe takeoff.</td>
</tr>
<tr>
<td>165</td>
<td></td>
<td>Describe aircraft pressurization.</td>
</tr>
<tr>
<td>166</td>
<td></td>
<td>Describe environmental control systems.</td>
</tr>
<tr>
<td>167</td>
<td></td>
<td>Describe use of aircraft operations checklists.</td>
</tr>
<tr>
<td>168</td>
<td></td>
<td>Describe taxiing techniques in wind.</td>
</tr>
<tr>
<td>169</td>
<td></td>
<td>Describe regulations related to VOR systems.</td>
</tr>
<tr>
<td>170</td>
<td></td>
<td>Describe anti-icing and de-icing systems.</td>
</tr>
<tr>
<td>171</td>
<td></td>
<td>Describe takeoff and landing maneuvers.</td>
</tr>
<tr>
<td>172</td>
<td></td>
<td>Describe effective communication.</td>
</tr>
<tr>
<td>173</td>
<td></td>
<td>Describe departure procedures.</td>
</tr>
<tr>
<td>174</td>
<td></td>
<td>Describe communication with ATC.</td>
</tr>
<tr>
<td>Task Number</td>
<td>8732</td>
<td>Tasks/Competencies</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>-------------------</td>
</tr>
<tr>
<td>175</td>
<td></td>
<td>Describe the ATC system and services.</td>
</tr>
<tr>
<td>176</td>
<td></td>
<td>Describe air navigation.</td>
</tr>
<tr>
<td>177</td>
<td></td>
<td>Describe aeronautical charts.</td>
</tr>
<tr>
<td>178</td>
<td></td>
<td>Describe dead reckoning.</td>
</tr>
<tr>
<td>179</td>
<td></td>
<td>Describe the effects of wind.</td>
</tr>
<tr>
<td>180</td>
<td></td>
<td>Describe the VOR system.</td>
</tr>
<tr>
<td>181</td>
<td></td>
<td>Interpret readings on an aircraft course and DME indicator.</td>
</tr>
<tr>
<td>182</td>
<td></td>
<td>Describe environmental control systems as related to humidity and illumination control.</td>
</tr>
<tr>
<td>183</td>
<td></td>
<td>Describe scanning techniques as related to collision avoidance.</td>
</tr>
<tr>
<td>184</td>
<td></td>
<td>Describe the role of TCAS in collision avoidance.</td>
</tr>
<tr>
<td>185</td>
<td></td>
<td>Identify common student errors.</td>
</tr>
<tr>
<td>186</td>
<td></td>
<td>Describe ground-reference maneuvers.</td>
</tr>
<tr>
<td>187</td>
<td></td>
<td>Describe VFR on top.</td>
</tr>
<tr>
<td>188</td>
<td></td>
<td>Describe night and high-altitude operations.</td>
</tr>
<tr>
<td>189</td>
<td></td>
<td>Describe management of emergency situations.</td>
</tr>
</tbody>
</table>

Legend: ✤Essential  ○Non-essential  ❌Omitted

---

**Curriculum Framework**

**Understanding Aircraft Performance**
Task Number 39

Calculate airspeed.

Definition

Calculation should include the following:

- The use of data in flying operations for safe and efficient aircraft operation

PLT002

Task Number 40

Calculate center of gravity.

Definition

Calculation should include the following:

- Check the weight of the passengers, the weight of all baggage to be carried, and the empty weight of the aircraft to be sure that the total weight does not exceed the maximum allowable weight.

PLT003

Task Number 41

Calculate a course intercept.

Definition

Calculation should include the following:

- The angle of intercept is the angle between the heading of the aircraft (intercept heading) and the desired course.
- Controlling this angle by selection/adjustment of the intercept heading is the easiest and most effective way to control course interceptions.
• Angle of intercept must be greater than the degrees from course, but should not exceed 90°.

PLT001

Task Number 42

Calculate density altitude.

Definition

Calculation should include the following:

• Density altitude is pressure altitude corrected for nonstandard temperature.
• As the density of the air increases (lower density altitude), aircraft performance increases.

PLT005

Task Number 43

Calculate landing speed and distance.

Definition

Calculation should include the following:

• The minimum landing distance is obtained by landing at some minimum safe speed that allows sufficient margin above stall and provides satisfactory control and capability for a go-around.
• Generally, the landing speed is some fixed percentage of the stall speed or minimum control speed for the aircraft in the landing configuration.
• The exact values depend on the aircraft characteristics but, once defined, the values are independent of weight, altitude, and wind.

PLT008

Task Number 44

Calculate turbine temperatures.
Definition
Calculation should include the following:

- Variations of exhaust gas temperature (EGT) systems bear different names based on the location of the temperature sensors.
- Common turbine temperature sensing gauges include the turbine inlet temperature (TIT) gauge, turbine outlet temperature (TOT) gauge, interstage turbine temperature (ITT) gauge, and turbine gas temperature (TGT) gauge.

PLT009

Task Number 45

Calculate takeoff speed and distance.

Definition
Calculation should include the following:

- The minimum takeoff distance is of primary interest in the operation of any aircraft because it defines the runway requirements.
- The minimum takeoff distance is obtained by taking off at some minimum safe speed that allows sufficient margin above stall and provides satisfactory control and initial rate of climb (ROC).
- Generally, the lift-off speed is some fixed percentage of the stall speed or minimum control speed for the aircraft in the takeoff configuration.
- Lift-off is accomplished at some particular value of lift coefficient and angle of attack (AOA).

PLT011

Task Number 46

Calculate time, speed, distance, course, fuel, and wind.

Definition
Calculation should include the following:

- Air navigation introduces the need for planning, which includes
  - plotting the course on an aeronautical chart
- selecting checkpoints
- measuring distances
- obtaining pertinent weather information
- computing flight time, headings, and fuel requirements.

**Task Number 47**

**Calculate wind correction.**

**Definition**

Calculation should include the following:

- By determining the amount of drift, the pilot can counteract the effect of the wind and make the track of the aircraft coincide with the desired course.

**Task Number 48**

**Calculate distance and bearing to a station.**

**Definition**

Calculation should include the following:

- To compute time and distance from a station, first turn the aircraft to place the radio magnetic indicator (RMI) bearing pointer on the nearest 90° index.
- Note the time and maintain the heading.
- When the RMI bearing pointer has moved 10°, note the elapsed time in seconds and apply formulas to determine the approximate time and distance from a given station.

**Task Number 49**

**Plan flight performance.**
**Definition**

Planning should include the following:

- Flight performance planning encompasses the computations of fuel used from engine start, taxi, takeoff, climb, enroute, descent, and landing.
- This also is affected by wind, altitude, and planned speeds used.

PLT015

---

**Task Number 50**

**Calculate fuel consumption.**

**Definition**

Calculation should include the following:

- To ensure that sufficient fuel is available for the intended flight, one must be able to accurately compute aircraft fuel consumption during preflight planning.

PLT016

---

**Task Number 51**

**Calculate lift-to-drag ratio.**

**Definition**

Calculation should include the following:

- The lift-to-drag ratio (L/D) is the amount of lift generated by a wing or airfoil compared to its drag.

PLT017

---

**Task Number 52**

**Calculate angle of attack (AOA).**
Definition

Calculation should include the following:

- The FAA, along with the General Aviation Joint Steering Committee (GAJSC), is promoting AOA indicators as one of the many safety initiatives aimed at reducing the general aviation accident rate.
- AOA indicators will specifically target Loss of Control (LOC) accidents.
- Loss of control is the number one root cause of fatalities in both general aviation and commercial aviation.
- Technology such as AOA indicators can have a tremendous impact on reversing this trend and are increasingly affordable for general aviation airplanes.

Task Number 53

Calculate pressure altitude.

Definition

Calculation should include the following:

- Pressure altitude—the altitude indicated when the altimeter setting window (barometric scale) is adjusted to 29.92 "Hg (inches of Mercury).
- This is the altitude above the standard datum plane, which is a theoretical plane where air pressure (corrected to 15 °C) equals 29.92 "Hg.
- Pressure altitude is used to compute density altitude, true altitude, true airspeed (TAS), and other performance data.

Task Number 54

Calculate turbulent air penetration.

Definition

Calculation should include the following:

- Each aircraft is designed with a specific G loading that can be imposed on the aircraft without causing structural damage.
• There are two types of load factors factored into aircraft design—limit load and ultimate load. The limit load is a force applied to an aircraft that causes a bending of the aircraft structure that does not return to the original shape. The ultimate load is the load factor applied to the aircraft beyond the limit load and at which point the aircraft material experiences structural failure (breakage).

PLT020

Task Number 55

Calculate weight and balance.

Definition

Calculation should include the following:

• Equipment changes or modifications affect the weight and balance data.
• Too often, pilots oversimplify the aircraft weight and balance to a rule of thumb, such as, “If I have three passengers, I can load only 100 gallons of fuel; four passengers, 70 gallons.”

PLT021

Task Number 56

Interpret drag ratio from charts.

Definition

Interpretation should include the following:

• Aircraft drag defines the thrust required to maintain steady, level flight.
• All parts of an aircraft contribute to the drag, either induced (from lifting surfaces) or parasite drag.

PLT046

Task Number 57

Interpret information on a performance curve chart.
Definition
Interpretation should include the following:

- Thrust is a force or pressure exerted on an object. Thrust is measured in pounds (lb) or newtons (N).
- Power is a measurement of the rate of performing work or transferring energy—kinetic energy (KE) and potential energy (PE). Power is typically measured in horsepower (hp) or kilowatts (kw).
- We can think of power as the motion (KE and PE) a force (thrust) creates when exerted on an object over a period of time.

PLT060

Task Number 58
Interpret information on a slush/standing water takeoff chart.

Definition
Interpretation should include the following:

- A contaminated runway is when more than 25 percent of the runway surface area (within the reported length and the width being used) is covered by frost, ice, and any depth of snow, slush, or water.

PLT069

Task Number 59
Interpret information on a velocity/load factor chart.

Definition
Interpretation should include the following:

- \( V_{NO} \)—velocity for normal operations; the maximum speed for normal operation or the maximum structural cruising speed
• This is the speed at which exceeding the limit load factor may cause permanent deformation of the aircraft structure.

PLT074

Task Number 60

Interpret information on takeoff charts.

Definition

Interpretation should include the following:

• Takeoff charts are typically provided in several forms and allow a pilot to compute the takeoff distance of the aircraft with no flaps or with a specific flap configuration.

PLT085

Task Number 61

Interpret a takeoff speeds chart.

Definition

Interpretation should include the following:

• Performance charts allow a pilot to predict the takeoff, climb, cruise, and landing performance of an aircraft.
• Information the manufacturer provides on these charts has been gathered from test flights conducted in a new aircraft, under normal operating conditions while using average piloting skills, and with the aircraft and engine in good working order.

PLT089

Task Number 62

Interpret weight and balance guidelines.

Definition
Interpretation should include the following:

- The Aircraft Flight Manual or Pilot’s Operating Handbook (AFM/POH) should be checked to determine the proper loading of the aircraft (weight and balance data).
- The weight of the usable fuel and drainable oil aboard must be known.
- The weight of the passengers, the weight of all baggage to be carried, and the empty weight of the aircraft must be confirmed to be sure that the total weight does not exceed the maximum allowable weight.

PLT092

---

**Task Number 63**

**Describe aircraft loading computations.**

**Definition**

Description should include the following:

- The distribution of the load must be known to determine whether the resulting center of gravity (CG) is within limits.
- The latest weight and balance information in the FAA-approved AFM or other permanent aircraft records must be used, as appropriate, to obtain empty weight and empty weight CG information.

PLT121

---

**Task Number 64**

**Describe effects of temperature.**

**Definition**

Description should include the following:

- Low clouds are those that form near the Earth’s surface and extend up to about 6,500 feet above ground level (AGL).
- They are made primarily of water droplets but can include super-cooled water droplets that induce hazardous aircraft icing.

PLT206
Task Number 65

Describe loading limitations.

Definition

Description should include the following:

- The mathematical measure of an aircraft’s tendency to rotate about its CG is called a moment.
- A moment is said to be equal to the product of the force applied and the distance at which the force is applied. (A moment arm is the distance from a datum [reference point or line] to the applied force.)
- For aircraft weight and balance computations, moments are expressed in terms of the distance of the arm times the aircraft’s weight, or simply, inch-pounds.

PLT313

Task Number 66

Describe performance planning in relation to aircraft loading.

Definition

Description should include the following:

- Weight and balance computations should be part of every preflight briefing.
- It should never be assumed that a given number of passengers is always the same weight. Instead, do a full computation of all items to be loaded on the aircraft, including baggage, as well as the pilot and passengers.
- It is recommended that all bags be weighed.

PLT328

Task Number 67

Describe constant and variable-speed propeller operations.

Definition
Description should include the following:

- A propeller with fixed blade angles is a fixed-pitch propeller. The pitch of this propeller is set by the manufacturer and cannot be changed.
- Since a fixed-pitch propeller achieves the best efficiency only at a given combination of airspeed and rpm, the pitch setting is ideal for neither cruise nor climb. Thus, the aircraft suffers a bit in each performance category.
- The fixed-pitch propeller is used when low weight, simplicity, and low cost are needed.
- The adjustable-pitch propeller was the forerunner of the constant-speed propeller.
- It is a propeller with blades whose pitch can be adjusted on the ground with the engine not running, but which cannot be adjusted in flight.

**Task Number 68**

**Calculate aircraft glide performance.**

**Definition**

Calculation should include the following:

- Aircraft have predetermined best glide speeds published in the Pilot’s Operational Handbook.

**Exploring Aeromedical Issues**

**Task Number 69**

**Define aeronautical decision-making (ADM).**

**Definition**

Definition should include the following:
Aeronautical decision-making is decision-making in a unique environment—aviation. It is a systematic approach to the mental process used by pilots to consistently determine the best course of action in response to a given set of circumstances.

Task Number 70

Describe critical phase of flight.

Definition

Description should include the following:

- In flying, most of the accidents happen during approach, landing, and takeoff.
- Research shows that 83 percent of the accidents occur during these stages; thus, it is very important that situational awareness is being observed during these stages of flights.
- One of the ways to increase situational awareness is by conducting a briefing before each of these critical stages of flights.

Task Number 71

Describe oxygen requirements.

Definition

Description should include the following:

- The FAA requires that all pilots flying their aircraft above 12,500 feet for 30 minutes or longer or at 14,000 feet or above during the entire flight must use supplemental oxygen.
- The amount required is one liter of oxygen per minute for every 10,000 feet.
Definition

Description should include the following:

- A number of health factors and physiological effects can be linked to flying. Some are minor, while others are important enough to require special attention to ensure safety of flight.

PLT096

Task Number 73

Describe effects of carbon monoxide poisoning.

Definition

Description should include the following:

- Exhaust system failures in general aviation (GA) aircraft can result in carbon monoxide (CO) exposure. When this occurs in an aircraft, the end result could be an accident.
- Research on detection and prevention of CO exposure in GA aircraft addressed the following objectives:
  - To identify protocols to quickly alert users to the presence of excessive CO in the cabin
  - To evaluate inspection methods and maintenance practices with respect to CO generation

PLT097

Task Number 74

Describe aeromedical factors related to fitness for flight.

Definition

Description should include the following:

- It is important for a pilot to be aware of the mental and physical standards required for the type of flying performed.

PLT098
Task Number 75

Describe aeromedical factors related to scanning procedures.

Definition

Description should include the following:

- Acquisition of a medical certificate requires an examination by an aviation medical examiner (AME), a physician with training in aviation medicine designated by the Civil Aerospace Medical Institute (CAMI).
- There are three classes of medical certificates. The class of certificate needed depends on the type of flying the pilot plans to perform.

PLT099

Task Number 76

Describe the effects of hazardous ADM.

Definition

Description should include the following:

- Attitude is a motivational predisposition to respond to people, situations, or events in a given manner.
- Studies have identified five hazardous attitudes that can interfere with the ability to make sound decisions and exercise authority properly: anti-authority, impulsivity, invulnerability, macho, and resignation.

PLT103

Task Number 77

Describe human factors that affect ADM.

Definition

Description should include the following:
• The goal of risk management is to proactively identify safety-related hazards and mitigate the associated risks.
• Risk management is an important component of ADM.
• When a pilot follows good decision-making practices, the inherent risk in a flight is reduced or even eliminated.

PLT104

Task Number 78
Describe the effects of alcohol on the body.

Definition

Description should include the following:

• As little as one ounce of liquor, one bottle of beer, or four ounces of wine can impair flying skills.
• Alcohol also renders a pilot more susceptible to disorientation and hypoxia.

PLT205

Task Number 79
Describe the effects of stress on the body.

Definition

Description should include the following:

• Stress is the body’s response to physical and psychological demands placed upon it.
• The body’s reaction to stress includes releasing chemical hormones (such as adrenaline) into the blood and increasing metabolism to provide more energy to the muscles.
• Blood sugar, heart rate, respiration, blood pressure, and perspiration all increase when the body experiences stress.

PLT231

Task Number 80
Describe human behavior with regard to dangerous tendencies.

Definition

Description should include the following:

- Studies of human behavior have tried to determine an individual’s predisposition to taking risks and the level of an individual’s involvement in accidents.
- Five traits were discovered in pilots prone to having accidents. These pilots
  - have disdain toward rules
  - have very high correlation between accidents on their flying records and safety violations on their driving records
  - can be categorized as thrill- and adventure-seeking
  - are impulsive rather than methodical and disciplined, both in their information gathering and in the speed and selection of actions to be taken
  - have a disregard for or tend to under-utilize outside sources of information, including copilots, flight attendants, flight service personnel, flight instructors, and ATC.

PLT232

Task Number 81

Describe human behavior with regard to defense mechanisms.

Definition

Description should include the following:

- The successful pilot possesses the ability to concentrate, manage workloads, and monitor and perform several tasks simultaneously.
- Some of the latest psychological screenings used in aviation test applicants' ability to multitask, measuring accuracy, as well as the individual’s ability to focus attention on several subjects simultaneously.

PLT233

Task Number 82
Describe a pilot’s healthy response to external pressure.

Definition

Description should include the following:

- The key to managing external pressure is to be ready for and accept delays.
- Remember that people get delayed when traveling on airlines, driving a car, or taking a bus.

PLT269

Task Number 83

Describe self-fulfillment with regard to the career of a pilot.

Definition

Description should include the following:

- Emotional pressure associated with acknowledging that skill and experience levels may be lower than a pilot would like them to be.

PLT270

Task Number 84

Describe the role of judgment in ADM.

Definition

Description should include the following:

- One practical application is called the Five Ps, which consist of “the plan, the plane, the pilot, the passengers, and the programming.”
- Each of these areas consists of a set of challenges and opportunities that every pilot encounters.
- Each challenge and opportunity can substantially increase or decrease the risk of successfully completing the flight based on the pilot’s ability to make informed and timely decisions.
Task Number 85

Describe stress management.

Definition

Description should include the following:

- Under the stress relief method (SRM) and the Five Ps, even the decision to make no changes to the current plan is made through a careful consideration of all the risk factors present.

Task Number 86

Describe in-flight illusions.

Definition

Description should include the following:

- Spatial disorientation specifically refers to the lack of orientation with regard to the position, attitude, or movement of the airplane in space.
- The body uses three integrated systems to ascertain orientation and movement in space:
  - Vestibular system—organs found in the inner ear that sense position by the way we are balanced
  - Somatosensory system—nerves in the skin, muscles, and joints that, along with hearing, sense position based on gravity, feeling, and sound
  - Visual system—eyes, which sense position based on what is seen

Task Number 87

Describe the learning process (levels of learning, transfer of learning, and incidental learning).
**Definition**

Description should include the following:

- **Characteristics of learning—PEMA:**
  - Purposeful (relate to student's goals)
  - comes through Experience
  - Multifaceted
    - Verbal, conceptual, perceptual, motor, emotional, problem solving
    - Incidental learning
  - Active process
- **Principles of learning—REEPIR:**
  - Readiness—provide purpose, motivation
  - Exercise—practice, repeat
  - Effect—provide pleasant, satisfying experience
  - Primacy—right the first time
  - Intensity—provide realism, vividness
  - Recency—summarize, repeat the important

PLT306

---

**Task Number 88**

**Describe the learning process as related to physical skills.**

**Definition**

Description should include the following:

- **Learning physical skills**
  - Desire to learn—motivation, law of readiness
  - Pattern to follow—provide a clear, step-by-step example
  - Perform the skill—student practice
  - Knowledge of results—critique, example
  - Progress follows a pattern—the learning curve; learning plateau
  - Duration and organization of lesson
  - Evaluation vs. critique (identify strengths and weaknesses)
  - Application of skill

PLT307

---

**Task Number 89**
Describe laws of learning elements.

Definition

Description should include the following:

- Transfer of learning
  - Positive vs. negative transfer
  - Recommendations
  - Plan for positive transfer
  - Prepare students to seek other applications
  - Assure thorough, high-order learning
  - Build students’ confidence in ability to transfer
  - Use materials to form valid concepts, generalizations, clear relationships

PLT308

Task Number 90

Describe oxygen systems.

Definition

Description should include the following:

- Oxygen system components consist of either pressurized or unpressurized systems.
- Unpressurized systems require the use of supplemental oxygen at specified FAA altitudes.
- Pressurized systems incorporate oxygen systems to maintain a pressurized compartment that does not require supplemental oxygen at or above specified altitudes.

PLT326

Task Number 91

Describe the need for oxygen system inspection.

Definition

Description should include the following:
• Oxygen systems, either as part of an aircraft system or supplemental oxygen bottles, have specified inspection and service instructions as part of the aircraft POH.

PLT327

**Task Number 92**

**Describe hyperventilation as related to cabin pressure.**

**Definition**

Description should include the following:

• Since many of the symptoms of hyperventilation are similar to those of hypoxia, it is important to correctly diagnose and treat the proper condition.
• If using supplemental oxygen, check the equipment and flow rate to ensure the symptoms are not hypoxia related.
• Common symptoms of hyperventilation include
  o visual impairment
  o unconsciousness
  o lightheaded or dizzy sensation
  o tingling sensations
  o hot and cold sensations
  o muscle spasms.

PLT329

**Task Number 93**

**Describe hypoxia.**

**Definition**

Description should include the following:

• *Hypoxia* means “reduced oxygen” or “not enough oxygen.”
• Common symptoms of hypoxia include
  o visual impairment
  o unconsciousness
  o lightheaded or dizzy sensation
  o tingling sensations
  o hot and cold sensations
• muscle spasms.

• Although any tissue will die if deprived of oxygen long enough, the greatest concern regarding hypoxia during flight is lack of oxygen to the brain, since it is particularly vulnerable to oxygen deprivation.

• Any reduction in mental function while flying can result in life-threatening errors.

• Hypoxia can be caused by several factors, including an insufficient supply of oxygen, inadequate transportation of oxygen, or the inability of the body tissues to use oxygen.

Task Number 94

Describe the physiological effects of scuba diving and flying.

Definition

Description should include the following:

• Scuba diving subjects the body to increased pressure, which allows more nitrogen to dissolve in body tissues and fluids.

• The reduction of atmospheric pressure that accompanies flying can produce physical problems for scuba divers.

• A pilot or passenger who intends to fly after scuba diving should allow the body sufficient time to rid itself of excess nitrogen absorbed during diving.

Task Number 95

Describe the threat of hyperventilation to pilots.

Definition

Description should include the following:

• Hyperventilation is the excessive rate and depth of respiration, leading to abnormal loss of carbon dioxide from the blood.

• This condition occurs more often among pilots than is generally recognized.

• In such cases, increased breathing rate and anxiety further aggravate the problem.

• Hyperventilation can lead to unconsciousness due to the respiratory system’s overriding mechanism to regain control of breathing.
Task Number 96

Describe concerns related to night vision.

Definition

Description should include the following:

- There are many good reasons to fly at night, but pilots must keep in mind that the risks of night flying are different than during the day and often times higher.
- Pilots who are cautious and educated on night-flying techniques can mitigate those risks and become very comfortable and proficient in the task.

Task Number 97

Define spatial disorientation.

Definition

Definition should include the following:

- Spatial disorientation is the state of confusion due to misleading information being sent to the brain from various sensory organs.
- In pilots, spatial disorientation results in a lack of awareness of the aircraft position in relation to a specific reference point.

Task Number 98

Describe positive exchange of flight controls.

Definition

Description should include the following:
When a flight instructor wishes the student to take control of the aircraft, he/she should say to the student, “You have the flight controls.” The student should acknowledge immediately by saying, “I have the flight controls.”

The flight instructor confirms by again saying, “You have the flight controls.”

Part of the procedure should be a visual check to ensure that the other person actually has the flight controls.

When returning the controls to the flight instructor, the student should follow the same procedure the instructor used when giving control to the student.

---

**Task Number 99**

**Describe regulations related to the use of narcotics, drugs, and intoxicating liquor.**

**Definition**

Description should include the following:

- The use of alcohol and drugs by pilots is regulated by FAR 91.17.
- Among other provisions, this regulation states that no person may operate or attempt to operate an aircraft
  - within eight hours of having consumed alcohol
  - while under the influence of alcohol
  - with a blood alcohol content of 0.04 percent or greater
  - while using any drug that adversely affects safety.

---

**Task Number 100**

**Describe considerations related to prescription and over-the-counter drugs.**

**Definition**

Description should include the following:

- Whether medicine is prescribed by a doctor or is an over-the-counter medication, a pilot must consider the effect it will have on his or her performance.
• When writing a prescription, a doctor explains the possible side-effects of the medication.

Task Number 101
Describe regulations related to hazardous operations.

Definition
Description should include the following:

- Hazardous operations means activities, processes, and procedures that, because of the nature of the equipment, facilities, personnel, environment involved or function being performed, may result in bodily injury or property damage.

Task Number 102
Describe dehydration and heat stroke.

Definition
Description should include the following:

- Dehydration is a critical loss of water from the body.
- Causes of dehydration are hot flight decks and flight lines, wind, humidity, and diuretic drinks, such as coffee, tea, alcohol, and caffeinated soft drinks.
- Some common signs of dehydration are headache, fatigue, cramps, sleepiness, and dizziness.
- Heat stroke is a condition caused by any inability of the body to control its temperature.
- Onset of this condition may be recognized by the symptoms of dehydration, but also has been known to be recognized only upon complete collapse.
Examining Atmospheric and Meteorological Conditions

Task Number 103
Define atmospheric adiabatic process.

Definition
Definition should include the following:

- Atmospheric adiabatic process is the process of transport of an atmospheric property solely by the mass motion (velocity field) of the atmosphere; also, the rate of change of the value of the advected property at a given point.

PLT024

Task Number 104
Define ceiling, according to the FAA.

Definition
The FAA’s definition of ceiling is "the height above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as broken, overcast, obscuration, and not classified as thin or partial."

PLT026

Task Number 105
Interpret a weather report.

Definition
Interpretation should include the following:
Areas of precipitation and thunderstorms are observed by radar on a routine basis. Radar weather reports are issued by radar stations at 35 minutes past the hour, with special reports issued as needed. Radar weather reports provide information on the type, intensity, and location of the echo top of the precipitation.

PLT037

Task Number 106

Interpret constant pressure chart and isotachs chart.

Definition

Interpretation should include the following:

- **Isotachs chart** is an alternate term for isobaric chart and is a weather map representing conditions on a surface of equal atmospheric pressure.
- The height above sea level at which the pressure is a particular value may vary from one location to another at any given time, and also varies with time at any one location, so it does not represent a surface of constant altitude/height.

PLT042

Task Number 107

Interpret analysis heights and temperature chart.

Definition

Interpretation should include the following:

- Surface observations provide local weather conditions and other relevant information.
- This information includes the type of report, station identifier, date and time, modifier (as required), wind, visibility, runway visual range (RVR), weather phenomena, sky condition, temperature/dewpoint, altimeter reading, and applicable remarks.

PLT043

Task Number 108
Interpret information on a convective outlook.

Definition

Interpretation should include the following:

- A convective outlook outlines areas where thunderstorms are forecast during the day one period.
- First issuance is 0600Z and is the initial day one outlook valid 1200Z that day until 1200Z the following day.
- The other issuances are 1300Z, 1630Z, 2000Z, and 0100Z, all valid until 1200Z the next day.
- Outlooks issue qualifiers for the level of risk (SLGT, MDT, HIGH), as well as areas of general thunderstorms.

Task Number 109

Interpret information on a METAR/SPECI report.

Definition

Interpretation should include the following:

- Surface aviation weather observations (METARs) are a compilation of weather elements of the current weather at ground stations across the United States.
- The network is made up of government-run facilities and privately contracted facilities that provide up-to-date weather information.

Task Number 110

Interpret information on a pilot weather report (PIREP).

Definition

Interpretation should include the following:
• Observations of upper-air weather prove to be more challenging than surface observations.
• There are only two methods by which upper-air weather phenomena can be observed—radiosonde observations and PIREPs.
• Pilots remain the only real-time source of information regarding turbulence, icing, and cloud heights, which is gathered from pilots in flight, through the filing of PIREPs.

Task Number 111

Interpret information on a convective outlook chart.

Definition

Interpretation should include the following:

• SEE TEXT—used for those situations where a SLGT risk was considered but at the time of the forecast, was not warranted
• SLGT (slight risk)—a high probability of 5–29 reports of 1 inch or larger hail, and/or 3–5 tornadoes, and/or 5–29 wind events, or a low/moderate probability of moderate to high risk being issued later if some conditions come together
• MDT (moderate risk)—a high probability of at least 30 reports of hail 1 inch or larger; or 6–19 tornadoes; or numerous wind events (30)
• HIGH (high risk)—a high probability of at least 20 tornadoes with at least two of them rated F3 (or higher), or an extreme derecho causing widespread (50 or more) wind events with numerous higher-end wind (80 mph or higher) and structural damage reports

Task Number 112

Interpret information on a SIGMET.

Definition

Interpretation should include the following:

• Observed weather condition reports are often used in the creation of forecasts for the same area.
• A variety of different forecast products are produced and designed to be used in the preflight planning stage.
The printed forecasts that pilots must understand are the terminal aerodrome forecast (TAF), aviation area forecast (FA), in-flight weather advisories (SIGMET, AIRMET), and the winds and temperatures aloft forecast (FD).

---

**Task Number 113**

**Interpret information on a significant weather prognostic chart.**

**Definition**

Interpretation should include the following:

- Such charts depict current or forecast weather and provide an overall picture of the United States and should be used in the beginning stages of flight planning.
- Typically, weather charts show the movement of major weather systems and fronts.
- Significant weather prognostic charts provide an overall forecast weather picture.

---

**Task Number 114**

**Interpret information on a surface-analysis chart.**

**Definition**

Interpretation should include the following:

- The surface analysis chart depicts an analysis of the current surface weather.

---

**Task Number 115**

**Interpret information on a terminal aerodrome forecast (TAF).**
Definition

Interpretation should include the following:

- A TAF is a report established for the five statute-mile radius around an airport.
- TAF reports are usually given for larger airports.
- Each TAF is valid for a 24-hour time period and is updated four times a day at 0000Z, 0600Z, 1200Z, and 1800Z.
- The TAF utilizes the same descriptors and abbreviations as used in the METAR report.

Task Number 116

Interpret information on a winds and temperatures aloft forecast (FB).

Definition

Interpretation should include the following:

- Winds and temperatures aloft forecasts provide wind and temperature forecasts for specific locations in the contiguous United States, including network locations in Hawaii and Alaska.
- Through 12,000 feet are true altitudes and above 18,000 feet are pressure altitudes. Wind direction is always in reference to true north and windspeed is given in knots.

Task Number 117

Describe the use of thunderstorm-detection equipment.

Definition

Description should include the following:

- No person may operate an aircraft that has a passenger-seating configuration, excluding any pilot seat, of 10 seats or more in passenger-carrying operations, except a helicopter operating under day visual flight rules (VFR) conditions, unless the aircraft is equipped
with either approved thunderstorm-detection equipment or approved airborne-weather radar equipment.

**Task Number 118**

**Describe aircraft anti-icing and de-icing.**

**Definition**

Description should include the following:

- Aircraft ground de-icing and anti-icing procedures serve three purposes:
  - Removal of any frozen or semi-frozen moisture from critical external surfaces of an aircraft on the ground prior to flight
  - Protection of those surfaces from the effects of such contaminants for the period between treatment and becoming airborne
  - Removal of any frozen or semi-frozen moisture from engine intakes and fan blades and protection of external surfaces from subsequent contamination prior to takeoff

**Task Number 119**

**Describe turbulent air penetration.**

**Definition**

Description should include the following:

- Most AFM/POH now include turbulent air penetration information, which help today’s pilots safely fly aircraft capable of a wide range of speeds and altitudes.

**Task Number 120**

**Describe atmospheric conditions.**
Definition

Description should include the following:

- Stability (or atmospheric stability) refers to air's tendency to either rise and create storms (instability), or to resist vertical movement (stability).

Task Number 121

Describe cloud formation and resulting weather.

Definition

Description should include the following:

- Clouds are visible indicators and are often indicative of future weather.
- For clouds to form, there must be adequate water vapor and condensation nuclei, as well as a method by which the air can be cooled.
- When the air cools and reaches its saturation point, the invisible water vapor changes into a visible state.
- Through the processes of deposition (also referred to as sublimation) and condensation, moisture condenses or sublimes onto miniscule particles of matter, like dust, salt, and smoke, known as condensation nuclei.
- The nuclei are important because they provide a means for the moisture to change from one state to another.
- Cloud type is determined by its height, shape, and characteristics. They are classified according to the height of their bases as low, middle, or high clouds, as well as clouds with vertical development.

Task Number 122

Describe fog formation and resulting weather.

Definition

Description should include the following:

- Fog is a cloud that is on the surface.
It typically occurs when the temperature of air near the ground is cooled to the air’s dew point. At this point, water vapor in the air condenses and becomes visible in the form of fog. Fog is classified according to the manner in which it forms and is dependent upon the current temperature and the amount of water vapor in the air.

Task Number 123

Describe icing formation and characteristics.

Definition

Description should include the following:

- Two conditions are necessary for structural icing in flight: (1) the aircraft must be flying through visible water such as rain or cloud droplets, and (2) the temperature at the point where the moisture strikes the aircraft must be 0°C or colder.
- Aerodynamic effects may cause the remaining portion to freeze. The way in which the remaining portion freezes determines the type of icing.
- The types of structural icing are clear, rime, and a mixture of the two. Each type has its identifying features.

Task Number 124

Describe a constant pressure analysis chart.

Definition

Description should include the following:

- A constant pressure chart (also called an isobaric chart) is a weather map representing conditions on a surface of equal atmospheric pressure.
- Constant pressure charts usually contain plotted data and analyses of the distribution of height of the surface (contours), wind (isotachs), temperature (isotherms), and sometimes humidity (isohumes).

Retrieved from https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_00-6B.pdf

PLT274
Task Number 125

Describe a forecast of winds and temperatures aloft (FB).

Definition

Description should include the following:

- Winds and temperatures aloft (FBs) are computer prepared forecasts produced in both a textual and graphical format to aid the pilot in determining the most favorable altitude based on winds and direction of flight.

PLT284

Task Number 126

Describe a height-velocity diagram.

Definition

Description should include the following:

- The height-velocity diagram depicts altitude and airspeed situations from which a successful auto-rotation can be made.
- The time required, and therefore, altitude necessary to attain a steady-state, auto-rotative descent is dependent on the weight of the helicopter and the density altitude.

PLT285

Task Number 127

Describe a significant-weather prognostic chart.

Definition

Description should include the following:

- The 36- and 48-hour prognostic chart is a day 2 forecast of general weather for the conterminous United States.
• The chart displays forecast positions and characteristics of pressure patterns, fronts, and precipitation.

PLT286

Task Number 128

Describe a surface-analysis chart.

Definition

Description should include the following:

• The surface-analysis chart is a computer-prepared report that is transmitted every 3 hours and covers the contiguous 48 states and adjacent areas. A surface-analysis chart shows the areas of high and low pressure, fronts, temperatures, dewpoints, wind directions and speeds, local weather, and visual obstructions.

PLT287

Task Number 129

Describe a terminal aerodrome forecast (TAF).

Definition

Description should include the following:

• A terminal aerodrome forecast (TAF) is a report established for the five statute mile radius around an airport. TAF reports are usually given for larger airports.
• Each TAF is valid for a 24-hour time period and is updated four times a day at 0000Z, 0600Z, 1200Z, and 1800Z.
• The TAF utilizes the same descriptors and abbreviations as used in the METAR report.

PLT288

Task Number 130

Describe a weather-depiction chart.
Definition

Description should include the following:

- A weather-depiction chart details surface conditions as derived from METAR and other surface observations.
- The weather depiction chart is prepared and transmitted by computer every 3 hours beginning at 0100 Zulu time, and is valid at the time of the plotted data.
- It is designed to be used for flight planning by giving an overall picture of the weather across the United States.

PLT289

Task Number 131

Describe AIRMETs and SIGMETs.

Definition

Description should include the following:

- AIRMETs (Airman's Meteorological Information) report weather events that are considered of operational interest to all types of aircraft. An AIRMET can be issued for such phenomena as moderate icing, moderate turbulence, high surface winds (more than 30 mph), instrument flight rules (IFR) conditions affecting a geographic area, and mountain obscuration.
- A SIGMET (Significant Meteorological Information) advises of non-convective weather that is potentially hazardous to all aircraft.
- SIGMETs are unscheduled products that are valid for four hours. However, conditions that are associated with hurricanes are valid for six hours.

Task Number 132

Describe in-flight aviation weather advisories.

Definition

Description should include the following:

- A service specifically designed to provide timely enroute weather information upon pilot request is known as the enroute flight advisory service (EFAS), or Flight Watch.
• EFAS provides a pilot with weather advisories tailored to the type of flight, route, and cruising altitude.
• EFAS can be one of the best sources for current weather information along the route of flight.

PLT294

Task Number 133

Describe inversion layers.

Definition

Description should include the following:

• Temperature inversion layers, also called thermal inversions or just inversion layers, are areas where the normal decrease in air temperature with increasing altitude is reversed and air above the ground is warmer than the air below it.
• Inversion layers can occur anywhere from close to ground level up to thousands of feet into the atmosphere.

PLT301

Task Number 134

Describe jet streams.

Definition

Description should include the following:

• Jet streams are fast flowing, narrow air currents found in the atmosphere of some planets, including Earth.
• The main jet streams are located near the altitude of the tropopause.

PLT302

Task Number 135

Describe severe weather watches (WW).
Definition

Description should include the following:

- Severe weather watch areas for tornadoes and severe thunderstorms are depicted by boxes outlined with heavy dashed lines.

PLT316

Task Number 136

Describe microbursts.

Definition

Description should include the following:

- A microburst is a strong downdraft that normally occurs over horizontal distances of 1 nautical mile (NM) or less and vertical distances of less than 1,000 feet.
- In spite of its small horizontal scale, an intense microburst could induce windspeeds greater than 100 knots and downdrafts as strong as 6,000 feet per minute.

PLT317

Task Number 137

Describe the distribution of notices to airmen (NOTAMs).

Definition

Description should include the following:

- A NOTAM is a notice filed with an aviation authority to alert aircraft pilots of any hazards en route or at a specific location. The authority in turn provides means of disseminating relevant NOTAMs to pilots.

PLT323

Task Number 138
Describe precipitation.

Definition

Description should include the following:

- Precipitation is an all-inclusive term denoting drizzle, rain, snow, ice pellets, hail, and ice crystals.
- Precipitation occurs when these particles grow in size and weight until the atmosphere no longer can suspend them and they fall.

Task Number 139
Describe a radar summary chart.

Definition

Description should include the following:

- A radar summary chart is a graphically depicted collection of radar weather reports (SDs) that displays areas of precipitation as well as information regarding the characteristics of the precipitation.
- The chart is published hourly at 35 minutes past the hour.

Task Number 140
Describe squall lines.

Definition

Description should include the following:

- A squall line is a line of thunderstorms often located along or ahead of a vigorous cold front.
- Squall lines may contain severe thunderstorms.
Task Number 141

Describe the effects of temperature on weather formations.

Definition

Description should include the following:

- For a thunderstorm to form, the air must have sufficient water vapor, an unstable lapse rate, and an initial lifting action to start the storm process.
- Some storms occur at random in unstable air, last for only an hour or two, and produce only moderate wind gusts and rainfall. These are known as air mass thunderstorms and are generally a result of surface heating.

PLT492

Task Number 142

Describe thermals and atmospheric stability.

Definition

Description should include the following:

- The stability of the atmosphere depends on its ability to resist vertical motion.
- In an unstable atmosphere, small vertical air movements tend to become larger, resulting in turbulent airflow and convective activity.
- Instability can lead to significant turbulence, extensive vertical clouds, and severe weather.

PLT494

Task Number 143

Describe formation of thunderstorms and associated hazards.

Definition
The combination of moisture and temperature determine the stability of the air and the resulting weather. Cool, dry air is very stable and resists vertical movement, which leads to good and generally clear weather. The greatest instability occurs when the air is moist and warm, as it is in the tropical regions in the summer.

**Task Number 144**

**Describe turbulence.**

**Definition**

Description should include the following:

- Turbulence within the cloud occurs with shear between updrafts and downdrafts. Potentially hazardous turbulence is present in all thunderstorms, and a severe thunderstorm can destroy an aircraft.

**Task Number 145**

**Describe windshear.**

**Definition**

Description should include the following:

- The gust front causes a rapid, and sometimes drastic, change in surface wind ahead of an approaching storm.

**Task Number 146**

**Describe VFR weather minimums.**
Definition

Description should include the following:

- No pilot may operate an aircraft under basic VFR when the flight visibility is less, or at a distance from clouds that is less, than that prescribed for the corresponding altitude and class of airspace.
- Refer to 14CFR part 91, section 91.157, Special VFR Weather Minimums.

PLT527

Operating the Aircraft

Task Number 147

Describe special-use airspace.

Definition

Definitions should include the following:

- Special-use airspace or special area of operation (SAO) is the designation for airspace in which certain activities must be confined, or where limitations may be imposed on aircraft operations that are not part of those activities.
- Certain special-use airspace areas can create limitations on the mixed use of airspace. The special-use airspace depicted on instrument charts includes the area name or number, effective altitude, time and weather conditions of operation, the controlling agency, and the chart panel location.
- On National Aeronautical Charting Group (NACG) en route charts, this information is available on one of the end panels.
- Special-use airspace usually consists of
  - prohibited areas
  - restricted areas
  - warning areas
  - military operation areas (MOAs)
  - alert areas
  - controlled firing areas (CFAs).
Task Number 148

Interpret information on a departure procedure (DP) chart.

Definition

Interpretation should include the following:

- DP charts are ATC-coded departure procedures, which have been established at certain airports to simplify clearance delivery procedures.

PLT052

Task Number 149

Interpret information on a high altitude chart.

Definition

Interpretation should include the following:

- IFR Enroute High Altitude Charts (Conterminous U.S. and Alaska) are designed for navigation at or above 18,000 feet mean sea level (MSL). This four-color series includes:
  - Jet Route Structure
  - RNAV (Area Navigation) Q-Routes
  - VHF (very high frequency) radio aids to navigation (frequency, ID, channel, geographic coordinates)
  - Selected airports
  - Reporting Points
  - NRS (Navigation Reference System) Waypoints
  - Revised every 56 days

PLT055

Task Number 150

Interpret information on a low altitude chart.

Definition
Interpretation should include the following:

- The U.S. IFR/VFR Low Altitude Planning Chart is designed for preflight and enroute flight planning for IFR/VFR flights.
- The chart is printed front-East, back-West, with insets for the east coast from Washington, D.C. to Boston and on the west coast, the Los Angeles-San Diego area.
- Information includes the depiction of low altitude LF/MF and VHF airways and mileages, navigational facilities, airports, special use airspace areas, cities, time zones, major drainage, a directory of airports with their airspace classification and a mileage table showing great circle distances between major airports, 40 x 36 inches.
- It is revised annually.

PLT058

---

Task Number 151

Interpret information on a sectional chart.

Definition

Interpretation should include the following:

- Sectional Aeronautical Charts are the primary navigational reference medium used by the VFR pilot community.
- The 1:500,000 scale Sectional Aeronautical Chart Series is designed for visual navigation of slow to medium speed aircraft.
- The topographic information featured consists of the relief and a judicious selection of visual checkpoints used for flight under VFR.
- The checkpoints include populated places, drainage patterns, roads, railroads, and other distinctive landmarks.
- These charts are updated every six months; most Alaska Charts are updated annually.

PLT064

---

Task Number 152

Interpret information on a tower en route control (TEC).

Definition

Interpretation should include the following:
• VFR terminal area charts are helpful when flying in or near class B airspace.
• They have a scale of 1:250,000 (1 inch = 3.43 NM or approximately 4 statute miles).
• These charts provide a more detailed display of topographical information and are revised semiannually, except for several Alaskan and Caribbean charts.

PLT073

Task Number 153

Interpret information in U.S. chart supplements.

Definition

Interpretation should include the following:

• The charts provide an abundance of information, including airport data, navigational aids, airspace, and topography.
• By referring to the chart legend, a pilot can interpret most of the information on the chart.
• A pilot should also check the chart for other legend information, which includes ATC frequencies and information on airspace.
• These charts are revised semiannually, except for some areas outside the conterminous United States, where they are revised annually.

PLT078

Task Number 154

Interpret information on an airways chart.

Definition

Interpretation should include the following:

• Sectional charts are the most common charts used by pilots today.
• The charts have a scale of 1:500,000 (1 inch = 6.86 NM or approximately 8 SM), which allows for more detailed information to be included on the chart.

PLT079

Task Number 155
Interpret information on an instrument approach procedures (IAP) chart.

Definition

Interpretation should include the following:

- The instrument landing system (ILS) is one kind of approach and on the chart it is typically labeled with ILS and the runway number (e.g., ILS31).
- The chart is made up of several areas, generally with communications information at the top, a plan (horizontal) view in the middle, a vertical profile below that and the minimums either below or next to the vertical profile.
- On the horizontal view one will see a number of fixes which can be flown to via the enroute system. Upon arriving at that point, one would begin flying the approach if cleared to do so by ATC.

PLT083

Task Number 156

Describe IFR en route low altitude aeronautical charts.

Definition

Description should include the following:

- There are three basic forms of navigation: pilotage, ded reckoning, and electronic.
- Electronic navigation is always associated with IFR flying, but a VFR pilot will use it regularly too. Electronic navigation is always evolving.

PLT100

Task Number 157

Describe pilotage aeronautical charts.

Definition

Description should include the following:
Advances in navigational radio receivers installed in aircraft, the development of aeronautical charts that show the exact location of ground transmitting stations and their frequencies, along with refined flight deck instrumentation make it possible for pilots to navigate with precision to almost any point desired.

Although precision in navigation is obtainable through the proper use of this equipment, beginning pilots should use this equipment to supplement navigation by visual reference to the ground (pilotage).

This method provides the pilot with an effective safeguard against disorientation in the event of radio malfunction.

---

**Task Number 158**

**Explain the difference between true north (TN) and magnetic north (MN).**

**Definition**

Explanation should include the following:

- Variation is the angle between TN and MN. It is expressed as east variation or west variation depending upon whether MN is to the east or west of TN.
- The north magnetic pole is located close to 71° N latitude, 96° W longitude and is about 1,300 miles from the geographic or true north pole.

**Task Number 159**

**Describe types of landing systems.**

**Definition**

Description should include the following:

- The visual approach slope indicator (VASI) is a system of lights on the side of an airport runway threshold that provides visual descent guidance information during approach. These lights may be visible from up to 8 kilometers (5.0 mi) during the day and up to 32 kilometers (20 mi) or more at night.
- Basic visual approach slope indicators consist of one set of lights set up some 7 meters (23 feet) from the start of the runway. Each light is designed so that it appears as either white or red, depending on the angle at which it is viewed from. When the pilot is
approaching the lights at the proper angle, meaning the pilot is on the glide slope, the first set of lights appears white and the second set appears red. When both sets appear white, the aircraft is too high, and when both appear red it is too low. This used to be the most common type of visual approach slope indicator system, however it is being phased out by precision approach path indicators (PAPIs), which are closer together and therefore more efficient to site and maintain.

Task Number 160

Describe VOR and NAV navigation systems.

Definition

Description should include the following:

- The VHF omnidirectional range (VOR) system is present in three slightly different navigation aids (NAVAIDs): VOR, VOR/distance measuring equipment (DME), and VORTAC.
- By itself it is known as a VOR, and it provides magnetic bearing information to and from the station.
- When DME is also installed with a VOR, the NAVAID is referred to as a VOR/DME.
- When military tactical air navigation (TACAN) equipment is installed with a VOR, the NAVAID is known as a VORTAC.
- DME is always an integral part of a VORTAC.
- Regardless of the type of NAVAID utilized (VOR, VOR/DME, or VORTAC), the VOR indicator behaves the same.

Task Number 161

Describe the pilotage method of navigation.

Definition

Description should include the following:

- Pilotage is navigation by reference to landmarks or checkpoints.
• It is a method of navigation that can be used on any course that has adequate checkpoints, but it is more commonly used in conjunction with dead reckoning and VFR radio navigation.

Task Number 162

Describe airspeed indicators (ASIs).

Definition

Description should include the following:

• Configured similarly to traditional panel layouts, the ASI is located on the left side of the screen and is displayed as a vertical speed tape.
• As the aircraft increases in speed, the larger numbers descend from the top of the tape.
• The TAS is displayed at the bottom of the tape through the input to the air data computer (ADC) from the outside air temperature probe.
• Airspeed markings for VX, VY, and rotation speed (VR) are displayed for pilot reference.
• An additional pilot-controlled airspeed bug is available to set at any desired reference speed.
• As on traditional analogue ASIs, the electronic airspeed tape displays the color-coded ranges for the flap operating range.

Task Number 163

Describe normal climb and descent rates.

Definition

Description should include the following:

• The primary factors most affected by performance are the takeoff and landing distance, rate of climb, ceiling, payload, range, speed, maneuverability, stability, and fuel economy.
• Some of these factors are often directly opposed. For example, high speed vs. short landing distance, long range vs. great payload, and high rate of climb vs. fuel economy. It
is the pre-eminence of one or more of these factors that dictates differences among aircraft and explains the high degree of specialization found in modern aircraft.

Task Number 164

Describe takeoff.

Definition

Description should include the following:

- The minimum takeoff distance is of primary interest in the operation of any airplane because it defines the runway requirements. The minimum takeoff distance is obtained by taking off at some minimum safe speed, which allows sufficient margin above stall and provides satisfactory control and initial rate of climb.
- To obtain minimum takeoff distance at the specific liftoff speed, the forces which act on the airplane must provide the maximum acceleration during the takeoff roll. The various forces acting on the airplane may or may not be under the control of the pilot, and various techniques may be necessary in certain airplanes to maintain takeoff acceleration at the highest value.
- The powerplant thrust is the principal force to provide the acceleration and, for minimum takeoff distance, the output thrust should be at a maximum.
- Lift and drag are produced as soon as the airplane has speed, and the values of lift and drag depend on the angle of attack and dynamic pressure.

Task Number 165

Describe aircraft pressurization.

Definition

Description should include the following:

- Crew and passengers use oxygen systems, in conjunction with pressurization systems, to prevent hypoxia.
- Regulations require, at a minimum, flight crews have and use supplemental oxygen after 30 minutes exposure to cabin pressure altitudes between 12,500 and 14,000 feet.
• Use of supplemental oxygen is required immediately upon exposure to cabin pressure altitudes above 14,000 feet.
• Every aircraft occupant, above 15,000 feet cabin pressure altitude, must have supplemental oxygen. However, based on a person’s physical characteristics and condition, a person may feel the effects of oxygen deprivation at much lower altitudes.

PLT134

Task Number 166

Describe environmental control systems.

Definition

Description should include the following:

• Continuous-flow oxygen systems are usually provided for passengers.
• The passenger mask typically has a reservoir bag that collects oxygen from the continuous-flow oxygen system during the time when the mask user is exhaling.
• The oxygen collected in the reservoir bag allows a higher aspiratory flow rate during the inhalation cycle, which reduces the amount of air dilution.
• Ambient air is added to the supplied oxygen during inhalation after the reservoir bag oxygen supply is depleted.
• The exhaled air is released to the cabin.

PLT190

Task Number 167

Describe use of aircraft operations checklists.

Definition

Description should include the following:

• Aircraft operating manuals incorporate the use of checklists to accomplish the necessary actions required for the safe operation of flight.
• Pilots should use all checklists from pre-flight thru landing.

PLT122
Task Number 168

Describe taxiing techniques in wind.

Definition

Description should include the following:

- Quartering headwind from the left—Turn aileron into the wind; in other words, turn yoke left, and keep elevator in the neutral position.
- Quartering headwind from the right—Turn aileron into the wind; in other words, turn yoke right, and keep elevator in the neutral position.
- Quartering tailwind from the left—Turn aileron out of the wind; in other words, turn yoke right, and push elevator in the down position.
- Quartering tailwind from the right—Turn aileron out of the wind; in other words, turn yoke left, and push elevator in the down position.

PLT485

Task Number 169

Describe regulations related to VOR systems.

Definition

Description should include the following:

- No person may operate a civil aircraft under IFR using the VOR system of radio navigation unless the VOR equipment of that aircraft
  o is maintained, checked, and inspected under an approved procedure; or
  o has been operationally checked within the preceding 30 days, and was found to be within the limits of the permissible indicated bearing error

PLT508

Task Number 170

Describe anti-icing and de-icing systems.

Definition
Description should include the following:

- Carburetor ice occurs due to the effect of fuel vaporization and the decrease in air pressure in the venturi, which causes a sharp temperature drop in the carburetor.
- If water vapor in the air condenses when the carburetor temperature is at or below freezing, ice may form on internal surfaces of the carburetor, including the throttle valve.

**Task Number 171**

**Describe takeoff and landing maneuvers.**

**Definition**

Description should include the following:

- The takeoff, with takeoff power and rpm at the most critical center of gravity, and with weight from the maximum weight at sea level to the weight for which takeoff certification is requested for each altitude:
  - may not require exceptional piloting skill or exceptionally favorable conditions throughout the ranges of altitude from standard sea level conditions to the maximum altitude for which takeoff and landing certification is requested, and
  - must be made in such a manner that a landing can be made safely at any point along the flight path if an engine fails. This must be demonstrated up to the maximum altitude for which takeoff and landing certification is requested or 7,000 feet density altitude, whichever is less.

**Task Number 172**

**Describe effective communication.**

**Definition**

Description should include the following:

- Operating in and out of a towered airport, as well as in a good portion of the airspace system, requires that an aircraft have two-way radio communication capability.
- For this reason, a pilot should be knowledgeable of radio station license requirements and radio communications equipment and procedures.
Task Number 173

Describe departure procedures.

Definition

Description should include the following:

- Standard instrument departure (SID) routes, also known as departure procedures (DP), are published flight procedures followed by aircraft on an IFR flight plan immediately after takeoff from an airport.

Task Number 174

Describe communication with ATC.

Definition

Description should include the following:

- Using proper radio phraseology and procedures contribute to a pilot’s ability to operate safely and efficiently in the airspace system.
- A review of the Pilot/Controller Glossary contained in the Aeronautical Information Manual (AIM) assists a pilot in the use and understanding of standard terminology.
- The AIM also contains many examples of radio communications.
- The International Civil Aviation Organization (ICAO) has adopted a phonetic alphabet that should be used in radio communications. When communicating with ATC, pilots should use this alphabet to identify their aircraft.

Task Number 175

Describe the ATC system and services.

Definition
In general aviation, the most common types of radios are VHF. A VHF radio operates on frequencies between 118.0 megahertz (MHz) and 136.975 MHz and is classified as 720 or 760 depending on the number of channels it can accommodate. VHF radios are limited to line of sight transmissions; therefore, aircraft at higher altitudes are able to transmit and receive at greater distances.

Task Number 176

Describe air navigation.

Definition

Description should include the following:

- Air navigation is the process of piloting an aircraft from one geographic position to another while monitoring one's position as the flight progresses.
- It introduces the need for planning, which includes plotting the course on an aeronautical chart, selecting checkpoints, measuring distances, obtaining pertinent weather information, and computing flight time, headings, and fuel requirements.

Task Number 177

Describe aeronautical charts.

Definition

Description should include the following:

- An aeronautical chart is the road map for a pilot flying under VFR.
- The chart provides information that allows pilots to track their position and provides available information that enhances safety.
- The three aeronautical charts used by VFR pilots are
  - Sectional
  - VFR Terminal Area
  - World Aeronautical.
Task Number 178

Describe dead reckoning.

Definition

Description should include the following:

- Pilotage is navigation by reference to landmarks or checkpoints.
- It is a method of navigation that can be used on any course that has adequate checkpoints, but it is more commonly used in conjunction with dead reckoning and VFR radio navigation.

Task Number 179

Describe the effects of wind.

Definition

Description should include the following:

- As discussed in the study of the atmosphere, wind is a mass of air moving over the surface of the Earth in a definite direction.
- When the wind is blowing from the north at 25 knots, it simply means that air is moving southward over the Earth’s surface at the rate of 25 NM in 1 hour.

Task Number 180

Describe the VOR system.

Definition

Description should include the following:
The VOR system is present in three slightly different navigation aids (NAVAIDs): VOR, VOR/distance measuring equipment (DME), and VORTAC.

**Task Number 181**

**Interpret readings on an aircraft course and DME indicator.**

**Definition**

Interpretation should include the following:

- The course deviation indicator (CDI) is found in most training aircraft.
- It consists of an omnibearing selector (OBS), sometimes referred to as the course selector, a CDI needle (left-right needle), and a TO/FROM indicator.
- The course selector is an azimuth dial that can be rotated to select a desired radial or to determine the radial over which the aircraft is flying.

**Task Number 182**

**Describe environmental control systems as related to humidity and illumination control.**

**Definition**

Description should include the following:

- Humidity and illumination can affect pilot comfort.
- Most large aircraft cockpits have a separate environmental control panel for pilots to regulate the ambient temperature.
- The illumination on the left and right side of the instrument panel should have the ability to be adjusted independently to suit the individual pilot.

**Task Number 183**
Describe scanning techniques as related to collision avoidance.

**Definition**

Description should include the following:

- Scanning techniques are very important in identifying objects at night.
- To scan effectively, pilots must look from right to left or left to right. They should begin scanning at the greatest distance an object can be perceived (top) and move inward toward the position of the aircraft (bottom).
- For each stop, an area approximately 30° wide should be scanned. The duration of each stop is based on the degree of detail that is required, but no stop should last longer than two to three seconds.

---

**Task Number 184**

Describe the role of TCAS in collision avoidance.

**Definition**

Description should include the following:

- A traffic collision avoidance system or traffic alert and collision avoidance system (both abbreviated as TCAS) is an aircraft collision avoidance system designed to reduce the incidence of mid-air collisions (MAC) between aircraft.
- It monitors the airspace around an aircraft for other aircraft equipped with a corresponding active transponder, independent of ATC, and warns pilots of the presence of other transponder-equipped aircraft which may present a threat of MAC.

---

**Task Number 185**

Identify common student errors.

**Definition**

Identification should include the following:
• To be the best pilot possible, one must be aware of possible mistakes.
• The five most common student pilot mistakes are related to the use of checklists, clearing turns, traffic pattern ops, runway environment, and VFR operations.

PLT218

Task Number 186

Describe ground-reference maneuvers.

Definition

Description should include the following:
• Ground-reference maneuvers are intended to develop an understanding of how the wind influences the ground track.
• They develop skill and confidence to a point where one can safely maneuver the airplane while flying at low altitude and making corrections for the effect of the wind.
• Ground-reference maneuvers are a required part of the private pilot practical test, and one will need these skills when operating in the airport traffic pattern.

PLT219

Task Number 187

Describe VFR on top.

Definition

Description should include the following:
• A pilot on an IFR flight plan operating in VFR weather conditions, may request VFR-on-top in lieu of an assigned altitude.
• This permits a pilot to select an altitude or flight level of their choice (subject to any ATC restrictions).

PLT298

Task Number 188
Describe night and high-altitude operations.

Definition

Description should include the following:

- The following visual factors contribute to flying performance: good depth perception for safe landings, good visual acuity to identify terrain features and obstacles in the flightpath, and good color vision.
- Although vision is the most accurate and reliable sense, visual cues can be misleading, contributing to incidents occurring within the flight environment.

PLT220

Task Number 189

Describe management of emergency situations.

Definition

Description should include the following:

- The key to successful management of an emergency situation, and/ or preventing a non-normal situation from progressing into a true emergency, is a thorough familiarity with, and adherence to, the procedures developed by the airplane manufacturer and contained in the FAA-approved AFM/POH.

PLT208

SOL Correlation by Task

<table>
<thead>
<tr>
<th></th>
<th>Task Description</th>
<th>Mathematics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>Calculate airspeed.</td>
<td>AII.1</td>
</tr>
<tr>
<td>40</td>
<td>Calculate center of gravity.</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Calculate a course intercept.</td>
<td>AII.3, MA.3, MA.4, MA.7</td>
</tr>
<tr>
<td>42</td>
<td>Calculate density altitude.</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Calculate landing speed and distance.</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Calculate turbine temperatures.</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Calculate takeoff speed and distance.</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Calculate time, speed, distance, course, fuel, and wind.</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Calculate wind correction. <strong>Mathematics: MA.7</strong></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Calculate distance and bearing to a station.</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Plan flight performance. <strong>English: 11.1, 12.1</strong></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Calculate fuel consumption.</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Calculate lift-to-drag ratio.</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Calculate angle of attack (AOA). <strong>Mathematics: AII.1, MA.7</strong></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Calculate pressure altitude.</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Calculate turbulent air penetration.</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Calculate weight and balance.</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Interpret drag ratio from charts. <strong>English: 11.5, 12.5</strong></td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Interpret information on a performance curve chart. <strong>English: 11.5, 12.5</strong> <strong>Mathematics: AII.7</strong></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Interpret information on a slush/standing water takeoff chart. <strong>English: 11.5, 11.8, 12.5, 12.8</strong></td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Interpret information on a velocity/load factor chart. <strong>English: 11.5, 12.5</strong> <strong>Mathematics: AII.4, AII.7</strong></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Interpret information on takeoff charts. <strong>English: 11.5, 12.5</strong></td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>Interpret a takeoff speeds chart. <strong>English: 11.5, 12.5</strong> <strong>Mathematics: AII.7</strong></td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>Interpret weight and balance guidelines. <strong>English: 11.5, 11.8, 12.5, 12.8</strong> <strong>Mathematics: AII.1</strong></td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>Describe aircraft loading computations. <strong>English: 11.5, 12.5</strong> <strong>Mathematics: AII.1</strong></td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>Describe effects of temperature. <strong>English: 11.5, 12.5</strong></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>Describe loading limitations. <strong>English: 11.5, 12.5</strong> <strong>Mathematics: MA.7</strong></td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>Describe performance planning in relation to aircraft loading. <strong>English: 11.5, 12.5</strong></td>
<td></td>
</tr>
<tr>
<td>67</td>
<td>Describe constant and variable-speed propeller operations. <strong>English: 11.5, 12.5</strong></td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Calculate aircraft glide performance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>English:</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>69</td>
<td>Define <em>aeronautical decision-making</em> (ADM).</td>
<td>11.3, 11.5, 12.3, 12.5</td>
</tr>
<tr>
<td>70</td>
<td>Describe critical phase of flight.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>71</td>
<td>Describe oxygen requirements.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>72</td>
<td>Describe the physiological effects of altitude.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>73</td>
<td>Describe effects of carbon monoxide poisoning.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>74</td>
<td>Describe aeromedical factors related to fitness for flight.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>75</td>
<td>Describe aeromedical factors related to scanning procedures.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>76</td>
<td>Describe the effects of hazardous ADM.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>77</td>
<td>Describe human factors that affect ADM.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>78</td>
<td>Describe the effects of alcohol on the body.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>79</td>
<td>Describe the effects of stress on the body.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>80</td>
<td>Describe human behavior with regard to dangerous tendencies.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>81</td>
<td>Describe human behavior with regard to defense mechanisms.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>82</td>
<td>Describe a pilot’s healthy response to external pressure.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>83</td>
<td>Describe self-fulfillment with regard to the career of a pilot.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>84</td>
<td>Describe the role of judgment in ADM.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>85</td>
<td>Describe stress management.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>86</td>
<td>Describe in-flight illusions.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>87</td>
<td>Describe the learning process (levels of learning, transfer of learning, and incidental learning).</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>88</td>
<td>Describe the learning process as related to physical skills.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>89</td>
<td>Describe laws of learning elements.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>90</td>
<td>Describe oxygen systems.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>91</td>
<td>Describe the need for oxygen system inspection.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>92</td>
<td>Describe hyperventilation as related to cabin pressure.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>93</td>
<td>Describe hypoxia.</td>
<td>11.3, 11.5, 12.3, 12.5</td>
</tr>
<tr>
<td>94</td>
<td>Describe the physiological effects of scuba diving and flying.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>95</td>
<td>Describe the threat of hyperventilation to pilots.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>96</td>
<td>Describe concerns related to night vision.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>97</td>
<td>Define <em>spatial disorientation</em>.</td>
<td>11.3, 11.5, 12.3, 12.5</td>
</tr>
<tr>
<td>98</td>
<td>Describe positive exchange of flight controls.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>English:</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>99</td>
<td>Describe regulations related to the use of narcotics, drugs, and intoxicating liquor.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>100</td>
<td>Describe considerations related to prescription and over-the-counter drugs.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>101</td>
<td>Describe regulations related to hazardous operations.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>102</td>
<td>Describe dehydration and heat stroke.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>103</td>
<td>Define <em>atmospheric adiabatic process</em>.</td>
<td>11.3, 11.5, 12.3, 12.5</td>
</tr>
<tr>
<td>104</td>
<td>Define <em>ceiling</em>, according to the FAA.</td>
<td>11.3, 11.5, 12.3, 12.5</td>
</tr>
<tr>
<td>105</td>
<td>Interpret a weather report.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>106</td>
<td>Interpret constant pressure chart and isotachs chart.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>107</td>
<td>Interpret analysis heights and temperature chart.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>108</td>
<td>Interpret information on a convective outlook.</td>
<td>11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>109</td>
<td>Interpret information on a METAR/SPECI report.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>110</td>
<td>Interpret information on a pilot weather report (PIREP).</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>111</td>
<td>Interpret information on a convective outlook chart.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>112</td>
<td>Interpret information on a SIGMET.</td>
<td>11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>113</td>
<td>Interpret information on a significant weather prognostic chart.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>114</td>
<td>Interpret information on a surface-analysis chart.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>115</td>
<td>Interpret information on a terminal aerodrome forecast (TAF).</td>
<td>11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>116</td>
<td>Interpret information on a winds and temperatures aloft forecast (FB).</td>
<td>11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>117</td>
<td>Describe the use of thunderstorm-detection equipment.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>118</td>
<td>Describe aircraft anti-icing and de-icing.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>119</td>
<td>Describe turbulent air penetration.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>120</td>
<td>Describe atmospheric conditions.</td>
<td>11.5, 12.5</td>
</tr>
<tr>
<td>121</td>
<td>Describe cloud formation and resulting weather.</td>
<td>11.5, 12.5</td>
</tr>
</tbody>
</table>

Science: ES.12
<table>
<thead>
<tr>
<th>Page</th>
<th>Description</th>
<th>Language(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>Describe fog formation and resulting weather.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science: ES.12</td>
</tr>
<tr>
<td>123</td>
<td>Describe icing formation and characteristics.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>124</td>
<td>Describe a constant pressure analysis chart.</td>
<td>English: 11.5, 12.5, 12.8</td>
</tr>
<tr>
<td>125</td>
<td>Describe a forecast of winds and temperatures aloft (FB).</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>126</td>
<td>Describe a height-velocity diagram.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>127</td>
<td>Describe a significant-weather prognostic chart.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>128</td>
<td>Describe a surface-analysis chart.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>129</td>
<td>Describe a terminal aerodrome forecast (TAF).</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>130</td>
<td>Describe a weather-depiction chart.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>131</td>
<td>Describe AIRMETs and SIGMETs.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>132</td>
<td>Describe in-flight aviation weather advisories.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>133</td>
<td>Describe inversion layers.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>134</td>
<td>Describe jet streams.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science: ES.12</td>
</tr>
<tr>
<td>135</td>
<td>Describe severe weather watches (WW).</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>136</td>
<td>Describe microbursts.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>137</td>
<td>Describe the distribution of notices to airmen (NOTAMs).</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>138</td>
<td>Describe precipitation.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science: ES.12</td>
</tr>
<tr>
<td>139</td>
<td>Describe a radar summary chart.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>140</td>
<td>Describe squall lines.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>141</td>
<td>Describe the effects of temperature on weather formations.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>142</td>
<td>Describe thermals and atmospheric stability.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>143</td>
<td>Describe formation of thunderstorms and associated hazards.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science: ES.12</td>
</tr>
<tr>
<td>144</td>
<td>Describe turbulence.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>145</td>
<td>Describe windshear.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>146</td>
<td>Describe VFR weather minimums.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>147</td>
<td>Describe special-use airspace.</td>
<td>English: 11.3, 11.5, 12.3, 12.5</td>
</tr>
</tbody>
</table>

76
<table>
<thead>
<tr>
<th></th>
<th>Interpret information on a departure procedure (DP) chart.</th>
<th>English: 11.5, 12.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>148</td>
<td>Interpret information on a high altitude chart.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>149</td>
<td>Interpret information on a low altitude chart.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>150</td>
<td>Interpret information on a sectional chart.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>151</td>
<td>Interpret information on a tower en route control (TEC).</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>152</td>
<td>Interpret information in U.S. chart supplements.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>153</td>
<td>Interpret information on an airways chart.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>154</td>
<td>Interpret information on an instrument approach procedures (IAP) chart.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>155</td>
<td>Describe IFR en route low altitude aeronautical charts.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>156</td>
<td>Describe pilotage aeronautical charts.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>157</td>
<td>Explain the difference between true north (TN) and magnetic north (MN).</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>158</td>
<td>Describe types of landing systems.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>159</td>
<td>Describe VOR and NAV navigation systems.</td>
<td>English: 11.5, 11.8, 12.5, 12.8</td>
</tr>
<tr>
<td>160</td>
<td>Describe the pilotage method of navigation.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>161</td>
<td>Describe airspeed indicators (ASIs).</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>162</td>
<td>Describe normal climb and descent rates.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>163</td>
<td>Describe takeoff.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>164</td>
<td>Describe aircraft pressurization.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>165</td>
<td>Describe environmental control systems.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>166</td>
<td>Describe use of aircraft operations checklists.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>167</td>
<td>Describe taxiing techniques in wind.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>168</td>
<td>Describe regulations related to VOR systems.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>169</td>
<td>Describe anti-icing and de-icing systems.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>170</td>
<td>Describe takeoff and landing maneuvers.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>171</td>
<td>Describe effective communication.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>172</td>
<td>Describe departure procedures.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>173</td>
<td>Describe communication with ATC.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>174</td>
<td>Describe the ATC system and services.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>175</td>
<td>Describe air navigation.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>176</td>
<td>Describe aeronautical charts.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>177</td>
<td>Describe dead reckoning.</td>
<td>English: 11.5, 12.5</td>
</tr>
<tr>
<td>178</td>
<td>Describe the effects of wind.</td>
<td>English: 11.5, 12.5</td>
</tr>
</tbody>
</table>
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- College and Work Readiness Assessment (CWRA+)
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- National Career Readiness Certificate Assessment
- Professional Communications Certification Examination
- Small Unmanned Aircraft System (UAS) Safety Certification Examination
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Aircraft Pilot Training I (8731/36 weeks, 140 hours)
<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Operations</td>
<td>Air Traffic Controller</td>
</tr>
<tr>
<td></td>
<td>Flight Engineer</td>
</tr>
<tr>
<td></td>
<td>Pilot</td>
</tr>
<tr>
<td>Transportation Systems/Infrastructure</td>
<td>Pilot</td>
</tr>
<tr>
<td>Planning, Management and Regulation</td>
<td></td>
</tr>
</tbody>
</table>