

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.1 General**

(Knowledge Level 1)

Subjects	Theoretical Training Hours	TOPICS	Alternative Instructors
<i>The need to take human factors into account;</i>	1	<i>General concepts of Flight Safety; Incident/Accident Prevention Loop; Safety Culture; Quality and Safety; Human Factors definitions.</i>	1-2
<i>Incidents attributable to human factors/human error;</i>	0,50	<i>Causal and Contributing factors; Examples of past real events.</i>	1-2
<i>"Murphy's" law.</i>	0,50	<i>Historical events; Bernoulli's theorem; Memoryless property in probability and statistics; Influence of consequences in decision processes.</i>	1-2

2 Hours

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.2 Human Performance and Limitations**

**(Knowledge Level 1)**

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<b><i>Vision; Hearing;</i></b>	0,20	<i>Visible spectrum; Eye Structure; Cones and Rodes; Scotopic, Photopic and Mesopic visions; Colorblindness; Focal and Surround vision. Sound; Human auditory system; Audible spectrum; Proprioception and vestibular system.</i>	<b>1-2-3</b>
<b><i>Information Processing;</i></b>	0,20	<i>Cognitive processes; Learning; Serial and Parallel information processing; Information Processing system.</i>	<b>1-2-3-4</b>
<b><i>Attention and Perception;</i></b>	0,20	<i>Definition and types of attention; elements reducing attention; definition of Perception; illusions.</i>	<b>1-2-3-4</b>
<b><i>Memory;</i></b>	0,20	<i>Memory process; ways to access memory.</i>	<b>1-2-3-4</b>
<b><i>Claustrophobia and physical access.</i></b>	0,20	<i>Historical events; Bernoulli's theorem; Memoryless property in probability and statistics; Influence of consequences in decision processes.</i>	<b>1-2-3-4</b>

1 Hour

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.3 Social Psychology**

**(Knowledge Level 1)**

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i>Responsibility: individual and group;</i>	0,50	<i>Group and Team: differences; Ringelmann’s effect; Group dynamics; Power of Norms.</i>	<b>1-2-4</b>
<i>Motivation and de-motivation;</i>	0,50	<i>General concepts; Theories on motivation: Maslow’s Hierarchy of needs; Two-factors Herzberg’s theory; The Hawthorne Effect.</i>	<b>1-2-4</b>
<i>Peer pressure;</i>	0,25	<i>Power of Rules; Asch’s Experiment.</i>	<b>1-2-4</b>
<i>“Culture” issues;</i>	0,50	<i>Definition; Organizational Culture; Culture contexts ; Flight Safety Culture.</i>	<b>1-2-4</b>
<i>Team Working;</i>	1	<i>From Group to Team; Team development phases; Building elements of a working group: Operational, Structural and Qualitative elements.</i>	<b>1-2-4</b>
<i>Management, supervision and leadership;</i>	1	<i>Conflict management; Error management; Crew/Team/Maintenance Resource Management; Safety Management System; Role of the supervisor; Different leadership styles; Authoritative vs Authoritarianism.</i>	<b>1-2-4</b>
<i>Military environment and other military factors.</i>	0,25	<i>Limitation of rights; Force Protection activity vs Maintenance activity; Operational Theatres: working environment and separation from families; Hierarchy; Joint operations.</i>	<b>1-2-4</b>

4 Hours

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.4 Factors Affecting Performance**

(Knowledge Level 2)

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i><b>Fitness/health;</b></i>	0,25	<i>Diet and consequences of incorrect eating; healthy workout.</i>	<b>1-2-3</b>
<i><b>Stress: domestic and work related;</b></i>	1	<i>General concepts; The Yerkes-Dodson Curve; Common stressors in private life and aviation; Types of stress; Symptoms; Consequences; Managing stress.</i>	<b>1-2-3-4</b>
<i><b>Time pressure and deadlines;</b></i>	0,25	<i>Definition; Sources of time pressure.</i>	<b>1-2-4</b>
<i><b>Workload: overload and underload;</b></i>	0,25	<i>Overload, consequences and symptoms; Underload: consequences and symptoms.</i>	<b>1-2-4</b>
<i><b>Sleep and fatigue, shiftwork;</b></i>	1	<i>Definitions; Classification; Factors: Circadian rhythm, Sleep Pressure, Sleep inertia; Types of fatigue; Airline Maintenance Errors Throughout the 24 hour day; effects of fatigue; Sleep phases; Sleep Physiology; Warnings and Effects; Napping; Polyphasic sleep; Fatigue avoidance.</i>	<b>1-2-3</b>
<i><b>Alcohol, medication and drug abuse.</b></i>	0,25	<i>What is alcohol; Effects on the Central nervous system and memory; Self-medication; Combination of different drugs.</i>	<b>1-2-3</b>

3 Hours

## AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A

## 9.5 Physical Environment

(Knowledge Level 1)

SUBJECTS	Theoretical Training Hours	TOPICS	Alternative Instructors
<i>Noise and fumes;</i>	0,20	<i>Sound and noise; Noise levels in working activities; fumes and vapours; unhealthy volatile substances; painting and solvents.</i>	<b>1-2-3-5</b>
<i>Illumination;</i>	0,20	<i>Illumination vs tasks and personnel; recommended illumination: quantitative and qualitative parameters.</i>	<b>1-2-3-5</b>
<i>Climate and temperature;</i>	0,20	<i>Influence of environment on human performance; hazards related to temperature and humidity.</i>	<b>1-2-3-5</b>
<i>Motion and vibration;</i>	0,20	<i>Motion in working environments; sources of vibration; consequences of vibration on human body.</i>	<b>1-2-3-5</b>
<i>Working environment.</i>	0,20	<i>Extension; complexity due to interdependency from other units/agencies/workshops/certification authorities.</i>	<b>1-2-3</b>

1 Hour

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.6 Taks**

**(Knowledge Level 1)**

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i>Physical works;</i>	0,25	<i>Principles of biomechanics; muscles and bones as levers; correct positions; muscoloskeletal injures.</i>	<b>1-2-3-5</b>
<i>Repetitive tasks;</i>	0,25	<i>Generality on mental tasks; risks: monotony, boringness, disinterestedness, inattention, self-confidence, complacency.</i>	<b>1-2-4</b>
<i>Visual inspection;</i>	1	<i>Generality; different levels of visual inspections; typical target defects; search and decision functions.</i>	<b>1-2</b>
<i>Complex systems.</i>	0,5	<i>Complicated vs complex Systems; complexity and its characteristics; emerging properties.</i>	<b>1-2-3-4</b>

**2 Hours**

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.7 Communication**

**(Knowledge Level 2)**

SUBJECTS	Theoretical Training Hours	TOPICS	Alternative Instructors
<b><i>Within and between teams;</i></b>	1,25	<i>Principles of communication; ways to communicate; mass and interpersonal communication; operational communication; process of communication; listening; effective communication; assertive communication; different teams working on the same aircraft; exchanging information between changing shifts.</i>	<b>1-2-4</b>
<b><i>Work logging and recording;</i></b>	0,25	<i>Written communication, data logging and recording: pro's and con's; requirements for shift handover; scheduled and unscheduled tasks recording.</i>	<b>1-2</b>
<b><i>Keeping up to date, currency;</i></b>	0,25	<i>Change of tasks; risks in performing similar tasks.</i>	<b>1-2</b>
<b><i>Dissemination of information.</i></b>	0,25	<i>Vertical information dissemination: hierarchical chain; horizontal information dissemination: peers exchange of information.</i>	<b>1-2</b>

2 Hours

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.8 Human error**

**(Knowledge Level 1)**

<b>Subjects</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i>Error models and theories;</i>	0,50	<i>Human error; Rasmussen Model; SHELL Model; "Swiss Cheese Model"; Error, Slip, Lapse , Mistake, Violation.</i>	<b>1-2</b>
<i>Types of error in maintenance tasks;</i>	0,50	<i>Statistics on most frequently occurring errors in maintenance tasks; Gordon Dupont's "The Dirty Dozen".</i>	<b>1-2</b>
<i>Implications of errors (i.e. accidents);</i>	0,50	<i>Case studies (A level maintenance errors).</i>	<b>1-2</b>
<i>Avoiding and managing errors.</i>	0,50	<i>Error Management Strategies; Human Factor and Classification System (HFACS); Maintenance Error Decision Aid (MEDA).</i>	<b>1-2</b>

**2 Hours**



**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY A**

**9.9 Hazards in the Workplaces**

(Knowledge Level 2)

SUBJECTS	Theoretical Training Hours	TOPICS	Alternative Instructors
<i>Recognising and avoiding hazards;</i>	0,50	<i>Hazards and Risks; Safety Obligations by law; Predictive identification of Safety Hazards; Proactive hazard identification and reporting system.</i>	<b>1-2-5</b>
<i>Dealing with emergencies.</i>	0,50	<i>Emergency occurrence; Emergency teams required by law; Medical Rescue; Fire Fighting; Airport Accidents; Airport Emergency Plan.</i>	<b>1-2-5</b>

1Hour
-------

<b>Total Module 9 Theoretical Training Hours for Category A</b>	<b>18 Hours</b>
---	-----------------

The scheme below specify the Qualifications of the alternative Instructors indicated for each Topic

Ref. number	Qualification required
<b>1</b>	Flight Safety Officer qualified by ISSV (Ispettorato per la Sicurezza del Volo) or by other military/equivalent governmental organizations (minimal duration course: 4 weeks)
<b>2</b>	Attendance at Universities or <i>EASA Part 147 Organisations</i> of at least one course for each of the following typologies: <i>Accident Prevention/Investigation (for Aircraft or Helicopter or Drone)</i> <i>Safety Management System</i> <i>Aviation Maintenance Investigation</i> <i>Human Factors (in Maintenance or in Accident Investigation)</i>
<b>3</b>	Doctor
<b>4</b>	Psychologist
<b>5</b>	"RSPP" (Prevention and Safety Workplace Advisor)

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.1 General**

**(Knowledge Level 2)**

<b>Subjects</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<b><i>The need to take human factors into account;</i></b>	1	<i>General concepts of Flight Safety; Incident/Accident Prevention Loop; Safety Culture; Quality and Safety; Human Factors definitions.</i>	<b>1-2</b>
	1	<i>ICAO definitions, and International Standards and Recommendation Practices; Margin Theory; Flight Safety Tools; Statistics; Cannibalization; Flight Safety and Quality, areas of overlap; Education, information and training for maintenance personnel.</i>	<b>1-2</b>
<b><i>Incidents attributable to human factors/human error;</i></b>	0,50	<i>Causal and Contributing factors; Examples of past real events.</i>	<b>1-2</b>
<b><i>"Murphy's" law.</i></b>	0,50	<i>Historical events; Bernoulli's theorem; Memoryless property in probability and statistics; Influence of consequences in decision processes.</i>	<b>1-2</b>

3 Hours

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.2 Human Performance and Limitations**

**(Knowledge Level 2)**

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<b>Vision; Hearing;</b>	0,20	<i>Visible spectrum; Eye Structure; Cones and Rodes; Scotopic, Photopic and Mesopic visions; Colorblindness; Focal and Surround vision. Sound; Human auditory system; Audible spectrum; Proprioception and vestibular system.</i>	<b>1-2-3</b>
<b>Information Processing;</b>	0,20	<i>Cognitive processes; Learning; Serial and Parallel information processing; Information Processing system.</i>	<b>1-2-3-4</b>
	1	<i>Behaviourism, Cognitivism and Constructivism; Cognitive Learning; classical and operant Conditioning Learning; Thorndike's Law of effect; Brain and synapses; Stages of learning process; Rasmussen's Model.</i>	<b>1-2-3-4</b>
<b>Attention and Perception;</b>	0,20	<i>Definition and types of attention; elements reducing attention; definition of Perception; illusions.</i>	<b>1-2-3-4</b>
	0,50	<i>Levels of perception; Cerebral hemispheres; Interpretation of images.</i>	<b>1-2-3-4</b>
<b>Memory;</b>	0,20	<i>Memory process; ways to access memory.</i>	<b>1-2-3-4</b>
	0,50	<i>Sensory memory; Short-term memory; Long-term memory; Learning Curve; Recall Curve; Recency and Primacy effect.</i>	<b>1-2-3-4</b>
<b>Claustrophobia and physical access.</b>	0,20	<i>Historical events; Bernoulli's theorem; Memoryless property in probability and statistics; Influence of consequences in decision processes.</i>	<b>1-2-3-4</b>

3 Hours

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.3 Social Psychology**

**(Knowledge Level 1)**

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i>Responsibility: individual and group;</i>	0,50	<i>Group and Team: differences; Ringelmann’s effect; Group dynamics; Power of Norms.</i>	<b>1-2-4</b>
<i>Motivation and de-motivation;</i>	0,50	<i>General concepts; Theories on motivation: Maslow’s Hierarchy of needs; Two-factors Herzberg’s theory; The Hawthorne Effect.</i>	<b>1-2-4</b>
<i>Peer pressure;</i>	0,25	<i>Power of Rules; Asch’s Experiment.</i>	<b>1-2-4</b>
<i>“Culture” issues;</i>	0,50	<i>Definition; Organizational Culture; Culture contexts ; Flight Safety Culture.</i>	<b>1-2-4</b>
<i>Team Working;</i>	1	<i>From Group to Team; Team development phases; Building elements of a working group: Operational, Structural and Qualitative elements.</i>	<b>1-2-4</b>
<i>Management, supervision and leadership;</i>	1	<i>Conflict management; Error management; Crew/Team/Maintenance Resource Management; Safety Management System; Role of the supervisor; Different leadership styles; Authoritative vs Authoritarianism.</i>	<b>1-2-4</b>
<i>Military environment and other military factors.</i>	0,25	<i>Limitation of rights; Force Protection activity vs Maintenance activity; Operational Theatres: working environment and separation from families; Hierarchy; Joint operations.</i>	<b>1-2-4</b>

**4 Hours**

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.4 Factors Affecting Performance**

**(Knowledge Level 2)**

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i><b>Fitness/health;</b></i>	0,25	<i>Diet and consequences of incorrect eating; healthy workout.</i>	<b>1-2-3</b>
<i><b>Stress: domestic and work related;</b></i>	1	<i>General concepts; The Yerkes-Dodson Curve; Common stressors in private life and aviation; Types of stress; Symptoms; Consequences; Managing stress.</i>	<b>1-2-3-4</b>
<i><b>Time pressure and deadlines;</b></i>	0,25	<i>Definition; Sources of time pressure.</i>	<b>1-2-4</b>
<i><b>Workload: overload and underload;</b></i>	0,25	<i>Overload, consequences and symptoms; Underload: consequences and symptoms.</i>	<b>1-2-4</b>
<i><b>Sleep and fatigue, shiftwork;</b></i>	1	<i>Definitions; Classification; Factors: Circadian rhythm, Sleep Pressure, Sleep inertia; Types of fatigue; Airline Maintenance Errors Throughout the 24 hour day; effects of fatigue; Sleep phases; Sleep Physiology; Warnings and Effects; Napping; Polyphasic sleep; Fatigue avoidance.</i>	<b>1-2-3</b>
<i><b>Alcohol, medication and drug abuse.</b></i>	0,25	<i>What is alcohol; Effects on the Central nervous system and memory; Self-medication; Combination of different drugs.</i>	<b>1-2-3</b>

3 Hours

## AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2

## 9.5 Physical Environment

(Knowledge Level 1)

SUBJECTS	Theoretical Training Hours	TOPICS	Alternative Instructors
<i>Noise and fumes;</i>	0,20	<i>Sound and noise; Noise levels in working activities; fumes and vapours; unhealthy volatile substances; painting and solvents.</i>	1-2-3-5
<i>Illumination;</i>	0,20	<i>Illumination vs tasks and personnel; recommended illumination: quantitative and qualitative parameters.</i>	1-2-3-5
<i>Climate and temperature;</i>	0,20	<i>Influence of environment on human performance; hazards related to temperature and humidity.</i>	1-2-3-5
<i>Motion and vibration;</i>	0,20	<i>Motion in working environments; sources of vibration; consequences of vibration on human body.</i>	1-2-3-5
<i>Working environment.</i>	0,20	<i>Extension; complexity due to interdependency from other units/agencies/workshops/certification authorities.</i>	1-2-3

1 Hour

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.6 Taks**

**(Knowledge Level 1)**

<b>SUBJECTS</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i>Physical works;</i>	0,25	<i>Principles of biomechanics; muscles and bones as levers; correct positions; musculoskeletal injuries.</i>	<b>1-2-3-5</b>
<i>Repetitive tasks;</i>	0,25	<i>Generality on mental tasks; risks: monotony, boringness, disinterestedness, inattention, self-confidence, complacency.</i>	<b>1-2-4</b>
<i>Visual inspection;</i>	1	<i>Generality; different levels of visual inspections; typical target defects; search and decision functions.</i>	<b>1-2</b>
<i>Complex systems.</i>	0,5	<i>Complicated vs complex Systems; complexity and its characteristics; emerging properties.</i>	<b>1-2-3-4</b>

2 Hours

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.7 Communication**

**(Knowledge Level 2)**

SUBJECTS	Theoretical Training Hours	TOPICS	Alternative Instructors
<b><i>Within and between teams;</i></b>	1,25	<i>Principles of communication; ways to communicate; mass and interpersonal communication; operational communication; process of communication; listening; effective communication; assertive communication; different teams working on the same aircraft; exchanging information between changing shifts.</i>	<b>1-2-4</b>
<b><i>Work logging and recording;</i></b>	0,25	<i>Written communication, data logging and recording: pro's and con's; requirements for shift handover; scheduled and unscheduled tasks recording.</i>	<b>1-2</b>
<b><i>Keeping up to date, currency;</i></b>	0,25	<i>Change of tasks; risks in performing similar tasks.</i>	<b>1-2</b>
<b><i>Dissemination of information.</i></b>	0,25	<i>Vertical information dissemination: hierarchical chain; horizontal information dissemination: peers exchange of information.</i>	<b>1-2</b>

2 Hours



**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.8 Human error**

**(Knowledge Level 2)**

<b>Subjects</b>	<b>Theoretical Training Hours</b>	<b>TOPICS</b>	<b>Alternative Instructors</b>
<i>Error models and theories;</i>	0,50	<i>Human error; Rasmussen Model; SHELL Model; “Swiss Cheese Model”; Error, Slip, Lapse , Mistake, Violation.</i>	<b>1-2</b>
	0,25	<i>Man Made Disasters Theory; Generic Error Modelling System.</i>	<b>1-2</b>
<i>Types of error in maintenance tasks;</i>	0,50	<i>Statistics on most frequently occurring errors in maintenance tasks; Gordon Dupont’s “The Dirty Dozen”.</i>	<b>1-2</b>
<i>Implications of errors (i.e. accidents);</i>	0,50	<i>Case studies (A level maintenance errors).</i>	<b>1-2</b>
	0,50	<i>Case studies (B level maintenance errors).</i>	<b>1-2</b>
<i>Avoiding and managing errors.</i>	0,50	<i>Error Management Strategies; Human Factor and Classification System (HFACS); Maintenance Error Decision Aid (MEDA).</i>	<b>1-2</b>
	0,25	<i>Error Management System.</i>	<b>1-2</b>

**3 Hours**

**AER(EP).P-66 - BASIC KNOWLEDGE - MODULE 9. HUMAN FACTORS – CATEGORY B1/B2**

**9.9 Hazards in the Workplaces**

(Knowledge Level 2)

SUBJECTS	Theoretical Training Hours	TOPICS	Alternative Instructors
<i>Recognising and avoiding hazards;</i>	0,50	<i>Hazards and Risks; Safety Obligations by law; Predictive identification of Safety Hazards; Proactive hazard identification and reporting system.</i>	<b>1-2-5</b>
<i>Dealing with emergencies.</i>	0,50	<i>Emergency occurrence; Emergency teams required by law; Medical Rescue; Fire Fighting; Airport Accidents; Airport Emergency Plan.</i>	<b>1-2-5</b>

1Hour
-------

<b>Total Module 9 Theoretical Training Hours for Category B1/B2</b>	<b>22 Hours</b>
---	-----------------

The scheme below specify the Qualifications of the alternative Instructors indicated for each Topic

Ref. number	Qualification required
<b>1</b>	Flight Safety Officer qualified by ISSV (Ispettorato per la Sicurezza del Volo) or by other military/equivalent governmental organizations (minimal duration course: 4 weeks)
<b>2</b>	Attendance at Universities or <i>EASA Part 147 Organisations</i> of at least one course for each of the following typologies: <i>Accident Prevention/Investigation (for Aircraft or Helicopter or Drone)</i> <i>Safety Management System</i> <i>Aviation Maintenance Investigation</i> <i>Human Factors (in Maintenance or in Accident Investigation)</i>
<b>3</b>	Doctor
<b>4</b>	Psychologist
<b>5</b>	“RSPP” (Prevention and Safety Workplace Advisor)