



International Air Force Semester
 IO: 2
 Doc.:
 Date : 10.01.2021
 Origin: AFAHC

Country	Institution	Module Description	ECTS
Romania	“Henri Coandă” Air Force Academy	Aviation Meteorology	2

Service	Minimum Qualification for Lecturers
AF	<ul style="list-style-type: none"> Officers: <ul style="list-style-type: none"> English: Common European Framework of Reference for Languages (CEFR) Level B2 or NATO STANAG Level 3. Thorough knowledge of general geography. Medium knowledge of physics. Medium knowledge of mathematics. Civilian Lecturers: <ul style="list-style-type: none"> English: Common European Framework of Reference for Languages (CEFR) Level B2 or NATO STANAG Level 3. Thorough knowledge of general geography. Medium knowledge of physics. Medium knowledge of mathematics.
Language	
English	

Prerequisites for international participants:	Goal of the Module
<ul style="list-style-type: none"> English: Common European Framework of Reference for Languages (CEFR) Level B1 or NATO STANAG Level 2. At least 1 year of national (military) higher education. 	<ul style="list-style-type: none"> To acquire specialized terminology in the field of aviation meteorology. To inform the students and develop their ability to understand the mechanisms by which meteorological factors influence flight activities. To acquire knowledge on meteorological phenomena and hazards that affect flight activities. Learning of a specialized language, coherent and concretely, able to ensure the achievement of a level of scientific training in accordance with the current requirements in the field.

Learning outcomes	Knowledge
	<ul style="list-style-type: none"> General information of aviation meteorology and definitions specific to this field. Classification of meteorological information. Understanding the observations on the weather. Associate weather patterns with phenomena which are known to influence flight activity. Possess knowledge about atmospheric phenomena, the interaction between them and the possible danger and impact on the flight safety. Students acquire necessary information in special codes used in the messages transmitted in aeronautical meteorology.
	Skills
	<ul style="list-style-type: none"> The ability to understand the meteorological information that affects flights. The ability to encode / decode meteorological information, according to the special codes used in the messages transmitted in aeronautical meteorology (METAR/SPECI, TAF, SIGMET).



International Air Force Semester
IO: 2
Doc.:
Date : 10.01.2021
Origin: AFAHC

	<ul style="list-style-type: none"> • The ability to identify the influence of meteorological factors on the flight activities, supported by aeronautical meteorology messages, weather charts, and satellite and radar imagery. • Appropriate decision-making skills for organizing and planning a flight.
<p>Responsibility & Autonomy</p>	<ul style="list-style-type: none"> • Autonomy in appropriate decision making with respect to weather information. • Ability to autonomously structure the meteorological information. • Ability to constantly update the aviation meteorology knowledge to the state-of-the-art information with the help of modern technology. • Ability to track changes in meteorological codes used in aviation and update knowledges. • Ability to analyse and synthesize weather information. • Development of teamwork skills and responsible behaviour in decision making.



International Air Force Semester
IO: 2
Doc.:
Date : 10.01.2021
Origin: AFAHC

Verification of Learning Outcomes	
Observation	<ul style="list-style-type: none"> Constantly recalling the information previously learned and observing the interest of students on aviation meteorology information and their level of understanding. This implies a prepared observation sheet.
Test	<ul style="list-style-type: none"> Multiple choice question format. To describe the basic characteristics and processes of some meteorological factors that influence flights. Decode the following products: METAR/SPECI, TAF, SIGMET.
Assignment	<ul style="list-style-type: none"> To observe the weather during the International Air Force Semester and identify and describe the meteorological characteristics which could affect flights. Decode meteorological information issued in METAR/SPECI, TAF, SIGMET. Watch several documentaries related to meteorology and discuss the information they provide.
Case study	<ul style="list-style-type: none"> Each student will receive a weather scenario with specific meteorological conditions. They will have to discuss how those conditions affect a flight.



Module Details

Main Topic	Recommended WH	Details
E-learning	3	<ul style="list-style-type: none"> • E-learning component of the Aviation Meteorology module consist of the following elements: <ul style="list-style-type: none"> • Application sites; • Short educational videos which will present real weather phenomena and animation of the processes involved in the formation of different types of weather. • e-Learning texts designed in such a manner that eases the learning process. • Slide presentations.
1. The atmosphere	2	<ul style="list-style-type: none"> • 1.1. Overview of the atmosphere. • 1.2. The vertical structure and composition of the atmosphere: troposphere, stratosphere, mesosphere, thermosphere, exosphere. • 1.3. Altitude variation of key meteorological elements (temperature, humidity, pressure, wind).
2. Global observing system	2	<ul style="list-style-type: none"> • 2.1. The structure of the system involved in weather observation (surface stations observation, radar observations, Upper-air stations, aircraft observation, marine observation, satellite observation, data circulation). • 2.2. The elements and phenomena that are observed in aviation meteorology. • 2.3. The usefulness of observations in aviation activity. • 2.4. Overview of Numerical Weather Prediction Models.
3. Solar radiation and heat exchange	2	<ul style="list-style-type: none"> • 3.1. Solar radiation and the role of radiative processes in heat transfer and generation/dissipation of weather phenomena. • 3.2. Thermal properties of the atmosphere and the earth's surface. • 3.3. Temperature and thermal processes.
4. Water in the atmosphere	4	<ul style="list-style-type: none"> • 4.1. Water in the atmosphere and associated processes. • 4.2. The water phase system (liquid, solid, gas). • 4.3. Physical quantities that define the humidity of the air. • 4.4. Meteorological phenomena associated with water phase transformations.
5. Clouds and nebulosity	2	<ul style="list-style-type: none"> • 5.1. Clouds formation processes and their description. • 5.2. Vertical distribution of clouds. • 5.3. Significant clouds for flights. • 5.4. Stability and instability of the atmosphere.
6. Precipitation	2	<ul style="list-style-type: none"> • 6.1. Overview and development of precipitation. • 6.2. Types of precipitation. • 6.3. Relationship with cloud types.
7. Atmospheric pressure	3	<ul style="list-style-type: none"> • 7.1. General references to atmospheric pressure. • 7.2. Isobars; horizontal and vertical variation of atmospheric pressure; atmospheric pressure systems.



		<ul style="list-style-type: none"> 7.3. Altimetry. 7.4. The effect of pressure, air temperature and humidity on air density and how this affects aircraft performances.
8. Wind	2	<ul style="list-style-type: none"> 8.1. Large-scale and local winds. 8.2. Upper atmosphere winds. 8.3. Turbulence: characteristics, origin of turbulence, intensity of turbulence, location of turbulence, the impact of turbulence on aircraft flights.
9. Visibility	2	<ul style="list-style-type: none"> 9.1. Types of visibility. 9.2. Atmospheric phenomena that reduces visibility. 9.3. Types of fog.
10. Fronts and air masses	2	<ul style="list-style-type: none"> 10.1. Description of general circulation of the atmosphere and air masses. 10.2. Properties, origins and types of air masses. 10.3. Types of fronts and associated clouds and weather.
11. Weather hazards in aviation	2	<ul style="list-style-type: none"> 11.1. Detailing Icing, turbulence, wind shear, wind associated with mountain areas, thunderstorms, heavy rain, hail, sandstorm, dust storm.
12. Meteorological Information and codes	8	<ul style="list-style-type: none"> 12.1. METAR/SPECI. 12.2. TAF. 12.3. SIGMET. 12.4. Analysis of weather charts: significant weather, 500 hPa geopotential height, surface analysis and prognosis.
13. Climatology	3	<ul style="list-style-type: none"> 13.1. Typical weather situations in Europe. 13.2. High- and low-pressure systems. 13.3. Seasonal variations of meteorological parameters.
Test	1	<ul style="list-style-type: none"> Module examination.
Self-Study Hours		
Reading	5	<ul style="list-style-type: none"> Study by textbook, course support, bibliography and notes. Additional documentation in the library, on specialized electronic platforms and in the field.
Exercises	3	<ul style="list-style-type: none"> Decode meteorological information.
Observation	2	<ul style="list-style-type: none"> Observe particular weather configurations and patterns; identification and description of meteorological characteristics which could affect flights.
Total WH	50	



International Air Force Semester	
ID:	2
Doc.:	
Date :	10.01.2021
Origin:	AFAHC

List of Abbreviations:

- CEFR Common European Framework of Reference for Languages
- ECTS European Credit Transfer and Accumulation System
- NATO North Atlantic Treaty Organisation
- STANAG Standardization Agreement
- WH Working Hour
- ICT Information and Communications Technology
- CSDP Common Security and Defence Policy
- EU European Union
- METAR METeorological Aerodrome Report
- SPECI Special METeorological Aerodrome Report
- TAF Terminal Aerodrome Forecast
- SIGMET Significant Meteorological Information

Acknowledgement

The course syllabus was developed in the context of the Strategic Partnership Project “International Air Force Semester” under the contract No. 2020-1-EL01-KA203-079068 co-funded by the Erasmus+ Programme of the European Union.



International Air Force Semester
2020-1-EL01-KA203-079068



The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

