

## COURSE OUTLINE

### 1. Data about the study programme

1.1 Higher education institution	Transilvania University of Brasov
1.2 Faculty	Technological Engineering and Industrial Management
1.3 Department	Engineering and Industrial Management
1.4 Field of study <sup>1)</sup>	Engineering and Management
1.5 Study level <sup>2)</sup>	MA
1.6 Study programme/ Qualification	Engineering and Management in Aviation / Master

### 2. Data about the course

2.1 Name of course	Air traffic management (ATM)							
2.2 Course convenor	Liviu GĂINĂ							
2.3 Seminar/ laboratory/ project convenor	Liviu GĂINĂ							
2.4 Study year	II	2.5 Semester	1	2.6 Evaluation type	E	2.7 Course status	Content <sup>3)</sup>	AC
							Attendance type <sup>4)</sup>	CPC

### 3. Total estimated time (hours of teaching activities per semester)

3.1 Number of hours per week	4	out of which: 3.2 lecture	2	3.3 seminar/ laboratory/ project	0/1/1
3.4 Total number of hours in the curriculum	56	out of which: 3.5 lecture	28	3.6 seminar/ laboratory/ project	0/14/14
Time allocation					hours
Study of textbooks, course support, bibliography and notes					20
Additional documentation in libraries, specialized electronic platforms, and field research					10
Preparation of seminars/ laboratories/ projects, homework, papers, portfolios, and essays					26
Tutorial					10
Examinations					3
Other activities:					
3.7 Total number of hours of student activity	69				
3.8 Total number per semester	125				
3.9 Number of credits <sup>5)</sup>	5				

### 4. Prerequisites (if applicable)

4.1 curriculum-related	<ul style="list-style-type: none"> <li>Not specified</li> <li>Navigation and Air Geography, Aeronautical Regulations</li> </ul>
4.2 competences-related	<ul style="list-style-type: none"> <li>It is preferable to have transversal competences, such as: ICT competence; autonomy of learning.</li> </ul>

### 5. Conditions (if applicable)

5.1 for course development	<ul style="list-style-type: none"> <li>It is necessary that the classroom be equipped with a computer and projection means (video projector and screen, or smart-board).</li> </ul>
5.2 for seminar/ laboratory/ project development	<ul style="list-style-type: none"> <li>The activities are carried out in semi-groups in specialized laboratories, at the simulator, in the park with aviation technology for education or at structures that have specialized equipment, respectively at ICDT.</li> </ul>

## 6. Specific competences and learning outcomes

Professional competences	<p>Cp.4. Adapts to changing situations</p> <p>L.O.4.3. The graduate will demonstrate in-depth knowledge and complex understanding of a particular field of scientific research and will use the results of research projects in order to improve the performance of the organization.</p> <ul style="list-style-type: none"> <li>• Knows the agreements, conventions and international organizations with a role in the development of regulations and coordination of civil aviation;</li> <li>• Identifies and understands the content and meaning of aeronautical regulations on flight activity (FA);</li> <li>• Knows the EUROCONTROL regulations, as well as the rules, norms and operating procedures for the FA;</li> <li>• Defines and operates with the basics of control, coordination and management of the FA;</li> </ul> <p>Identifies and defines the components of the air space and traffic control system;</p>
Transversal competences	<p>Ct.3. Negotiates with stakeholders</p> <p>L.O.3.1. The graduate will be able to achieve effective communication on technical and/or commercial issues with various suppliers and/or customers</p> <p>L.O.3.3. The graduate will be able to ensure a positive work climate at the workplace, favorable to stimulating the creativity of employees, so that they actively participate in achieving the organization's objectives.</p> <ul style="list-style-type: none"> <li>• Demonstrate teamwork skills, as well as linguistic communication skills, through the use of specialized conceptual devices;</li> <li>• Possesses necessary skills in the use of specific notions, with applicability in practical activity;</li> </ul> <p>Respect and develop professional values and ethics.</p>

## 7. Course objectives (resulting from the specific competences to be acquired)

7.1 General course objective	<ul style="list-style-type: none"> <li>• Acquiring knowledge, skills and competencies for the application of the provisions of regulations, rules and operating procedures necessary for the control, coordination and management of FA in safe and secure air conditions.</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>• Acquiring the specialized terminology used in the ATM field and the constructive elements of the system of supervision and coordination/management of activities in the airspace;</li> <li>• Acquiring skills for solving crisis situations by applying specific techniques and procedures resulting from aeronautical regulations.</li> </ul>

## 8. Content

8.1 Course	Teaching methods	Number of hours	Remarks
C1. MTA – role, place, importance, student motivation Presentation of the Course Outline (objectives, structure, method of evaluation)	Lecture-debate, problematization	2	
C2. Knowledge of specialized structures - Organization, role	Lecture-debate, problematization	2	
C3. Airspace Management (AM) - Definition, levels, general framework - Organization: zones, paths, routes - Structure and classes of the AM	Lecture-debate, problematization	2	
C4. Air Traffic Management (ATM) - Definition, systems, organization	Lecture-debate, problematization	2	
C5. Control of the use of the AM - Methods and means of control	Lecture-debate, problematization	2	

- ATM Control System and Booking			
C6. Air Traffic Management <ul style="list-style-type: none"> <li>- Air Traffic Services (ATS)</li> <li>- Air Traffic Flow Management (ATFM)</li> </ul>	Lecture-debate, problematization	2	
C7. Air traffic control (ATC) <ul style="list-style-type: none"> <li>- Air traffic structures</li> <li>- ATC Service &amp; Authorizations</li> <li>- Priorities for take-off/landing</li> <li>- Flight plan, position report</li> <li>- Alarm service, emergency situations</li> </ul>	Lecture-debate, problematization	2	
C8. Control of the airport. <ul style="list-style-type: none"> <li>- VFR Track Tour</li> <li>- 180° turn procedure above the aerodrome</li> <li>- Aircraft Staggering and Flight Levels Table</li> <li>- Signs and signals for aerodrome traffic</li> </ul>	Lecture-debate, problematization	2	
C9. Organizations and regulations <ul style="list-style-type: none"> <li>- National: SA Management Board (CMSA), Technical Committee for Aviation Safety</li> <li>- International : EUROCONTROL, EASA, EDA, SSC (Single Sky Comity)</li> <li>- National Air Code</li> <li>- Common civil-military regulations</li> </ul>	Lecture-debate, problematization	2	
C10. Providing and logistical support of flight activity (FA) <ul style="list-style-type: none"> <li>- FA level</li> <li>- Navigation, communications, IT, meteorological and ornithological insurance</li> <li>- Ensuring objective control</li> <li>- Flight logistics support</li> </ul>	Lecture-debate, problematization	2	
C11. Professional stress in ATC activity <ul style="list-style-type: none"> <li>- Categories of professional stress</li> <li>- The consequences of over-stress on performance</li> <li>- Techniques for stress management</li> </ul>	Lecture-debate, problematization	2	
C12. ATC Licensing Steps <ul style="list-style-type: none"> <li>- Levels (trainee ATC, ATC, ATC in training)</li> <li>- License Authorization</li> </ul>	Lecture-debate, problematization	2	
C13. Emergencies <ul style="list-style-type: none"> <li>- The Renegade Concept</li> <li>- Responsibility of the ATC, Emergency/Danger Messages</li> <li>- Recognition of a difficult situation</li> <li>- Indications on the RADAR screen</li> <li>- Providing the control service to an aircraft in difficulty</li> </ul>	Lecture-debate, problematization	2	
C14. Aeronautical Communications <ul style="list-style-type: none"> <li>- Message categories</li> <li>- Flight safety, regularity, ATIS, information and weather report messages</li> <li>- Identification of radionavigation means by MORSE code</li> </ul>	Lecture-debate, problematization	2	
<b>Total course hour</b>		<b>28</b>	

Bibliography			
1. * - National Air Code, <a href="https://www.caa.ro/CAA/Informatii%20generale/Legislatie%20general%C3%A2/Codul_Aerian_2020.pdf">https://www.caa.ro/CAA/Informatii%20generale/Legislatie%20general%C3%A2/Codul_Aerian_2020.pdf</a> 2. Flight regime in the airspace of Romania, GD 1172/2023, MO no. 724 of 16 Oct 2003 3. Operation of Communication, Navigation and Surveillance Systems, vol.II, Communication Procedures, Ministry of Transport, Bucharest, 2016 4. ATPL Communications Manual, Oxford Aviation Academy, 2006			
8.2 Seminar/ laboratory/ project	Teaching-learning methods	Number of hours	Remarks
L1. MTA – role, place, importance - Clarifications and correlations between structures and concepts of AM (Airspace Management) vs. ATM	Demonstration Application Modeling	2	
L2. The concept of conducting - Standard phraseology in ATC: TWR, APP - Airports: LROP, LRCB	Demonstration Application Modeling	2	
L3. Control of the use of the AirSpace Management (AM) - Methods and means of control - AM Control System and Booking	Demonstration Application Modeling	2	
L4. Air Traffic Management (ATM) - Air Traffic Services (ATS) - Air Traffic Flow Management (ATFM)	Demonstration Application Modeling	2	
L5. Air traffic control - simulator - Air traffic structures - ATC Service & Authorizations - Priorities for take-off/landing - Flight plan, position report - Alarm service, emergency situations	Demonstration Application Modeling	2	
L6. Aerodrome control - simulator - VFR Track Tour - 180° turn procedure above the aerodrome - Aircraft Staggering and Flight Levels Table - Signs and signals for aerodrome traffic	Demonstration Application Modeling	2	
L7. Emergencies - The Renegade Concept - Responsibility of the ATC, Emergency/Danger Messages - Recognition of a difficult situation - Indications on the RADAR screen - Providing the control service to an aircraft in difficulty	Demonstration Application Modeling	2	
P1. The Role, Place and Importance of ATM in Aviation Safety	Advocacy, debate	2	
P2. Specific Phraseology and Aerodrome Procedures Portfolio	Advocacy, debate	2	
P3. Use of the SA: control systems and reservation of the AM	Advocacy, debate	2	
P4. Air Traffic Flow Management (ATFM)	Advocacy, debate	2	
P5. Flight planning: plan, deposit, perform, control	Advocacy, debate	2	
P6. Traffic airport:	Advocacy, debate	2	
P7. Identifying emergency situations and ensuring the control service of an aircraft in difficulty, Renegade	Advocacy, debate	2	
<b>Total hours Seminar/ laboratory/ project</b>		<b>0/14/14</b>	

<p><b>Bibliography</b></p> <ol style="list-style-type: none"> <li>1. * - National Air Code, <a href="https://www.caa.ro/CAA/Informatii%20generale/Legislatie%20general%C3%A2/Codul_Aerian_2020.pdf">https://www.caa.ro/CAA/Informatii%20generale/Legislatie%20general%C3%A2/Codul_Aerian_2020.pdf</a></li> <li>2. Flight regime in the airspace of Romania, GD 1172/2023, MO no. 724 of 16 Oct 2003</li> <li>3. Operation of Communication, Navigation and Surveillance Systems, vol.II, Communication Procedures, Ministry of Transport, Bucharest, 2016</li> <li>4. ATPL Communications Manual, Oxford Aviation Academy, 2006</li> </ol>
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**9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)**

<p>The contents have been developed in relation to the employers' requirements, so that the learning results can be applied in the industrial environment and in research.</p>
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**10. Evaluation**

Activity Type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	Correctness and completeness of knowledge Degree of assimilation of specialized language and communication skills.	Written and/or oral examination: Docimological tests, conversation	50%
10.5 Seminar / laboratory / project	Logical coherence, fluency, expressiveness, argumentation force; The ability to analyze, personal interpretation, originality, creativity;	Elaboration of scientific reports on the subject of the discipline	25%
	The ability to operate with knowledge assimilated in complex intellectual activities; The ability to apply in practice, in different contexts, the knowledge learned; Computer/Simulator Testing	Practical work (use of applications and simulator operation)	25%
10.6 Minimum Performance Standard			
<ul style="list-style-type: none"> <li>• To identify, know and be able to practically apply the basic elements of the provisions of regulations, rules and operating procedures necessary for the control, coordination and conduct of flight activity in air safety conditions.</li> <li>• Preparation of P2 Specific Phraseology and Aerodrome Procedures Portfolio</li> </ul>			

This course outline was certified in the Department Board meeting on 17/09/2024 and approved in the Faculty Board meeting on 26/09/2024.

<p><b>Prof. Eng Tudor Ion DEACONESCU, PhD</b></p> <p><b>Dean</b></p>	<p><b>Assoc.Prof. Eng Flavius SÂRBU, PhD</b></p> <p><b>Head of Department</b></p>
<p><b>Lecturer Liviu GĂINĂ,</b></p> <p><b>Course holder</b></p>	<p><b>Lecturer Liviu GĂINĂ, PhD</b></p> <p><b>Holder of seminar/ laboratory/ project</b></p>

Note:

- 1) Field of study – select one of the following options: Bachelor / Master / Doctorat (to be filled in according to the forceful classification list for study programmes);
- 2) Study level – choose from among: Bachelor / Master / Doctorat;
- 3) Course status (content) – for the Bachelor level, select one of the following options: **FC** (fundamental course) / **DC** (course in the study domain)/ **SC** (speciality course)/ **CC** (complementary course); for the Master level, select one of the following options: **PC** (proficiency course)/ **SC** (synthesis course)/ **AC** (advanced course);
- 4) Course status (attendance type) – select one of the following options: **CPC** (compulsory course)/ **EC** (elective course)/ **NCPC** (non-compulsory course);
- 5) One credit is the equivalent of 25 study hours (teaching activities and individual study).