



UNDERGRADUATE STUDY: **AERONAUTICS**

SEMESTER (V)

Syllabus

Academic year 2023/2024

| | | | | | |
|---|------------------------------|--------------------------|--|-----------------------|---------------------------|
| Course: | | Aviation Medicine | | | |
| Head of course: Prof. Eduard Missoni , M.D., Ph.D. | | | | | |
| Co-lecturers: | | | | | |
| Semester: V | Course code: 74195 | Lectures: 30 | Seminars: 15 | Laboratory exercises: | ECTS credits: 4 |
| Group for lectures: 30 - 40 students | | | Group for seminars: 30 - 40 students | | |

Objective of the course:

- The course is devised to provide knowledge and understanding of aviation traffic injury risks and human factors in aviation safety. It consists of the following topics: human factors, human performance, human error, prevention of aviation accidents and health promotion in the transport sector, protection of the most vulnerable groups (including the elderly and children), personal risk factors, risk of injuries, human behaviour during fire and other kind of emergencies at sky, effects of environmental factors and atmospheric particles on human health, the most frequent travellers' diseases, and telemedicine. Furthermore, this course focuses on human factor issues pertaining to aviation with the aim of articulating and establishing the way forward in view of automation in aviation, directed mainly to the larger aviation community. Human factors within systems will also be discussed in detail while demonstrating how human performance and safety could be compromised due to inherent limitations in humans.

Learning outcomes:

After the completion of this course the students will be able to:

1. Understand and appreciate aviation transport and human performance in systems, procedures, and equipment in use.
2. Define the basic terms of aviation traffic accidents and the most important human factors in traffic and transport safety.
3. Evaluate the effectiveness of certain methods of protection of the most vulnerable group of persons participating in aviation traffic.
4. Explain the influence of alcohol, drugs and narcotics on human behaviour during flying.
5. Define the modalities of human behaviour occurring in the course of different kind of emergencies in the sky.





6. Identify the impact of environmental factors and atmospheric particles on human health, especially on the respiratory tract and distinguish the methods of protection.
7. Determine the most frequently encountered diseases among travellers, as well as explain the ways of transmission (fecal-oral route, by contact or by aerosol) of infective microorganisms.
8. Evaluate the advantages of telemedicine in aviation medicine



LECTURES and SEMINARS

| Week | Syllabus | Form of classes | Performed by | Lessons | Remark |
|------|--|-----------------|----------------|---------|--------|
| 1. | <ul style="list-style-type: none"> Introduction of the course's content. Initial lecture about aviation medicine, case studies, basic terminology, and literature. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Introduction. Establishing how learning techniques can improve learning. | S | Eduard Missoni | 1 | |
| 2. | <ul style="list-style-type: none"> Aviation accidents. Introduction; determinants of injuries, determinants by user type. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Basics of anatomy and physiology of human beings: respiratory system and the cardio-vascular system of the eye. | S | Eduard Missoni | 1 | |
| 3. | <ul style="list-style-type: none"> ICAO: Human factors and documents. Human factors within systems. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Basics of anatomy and physiology of human beings: central nervous system and the other organs essential in traffic. | S | Eduard Missoni | 1 | |
| 4. | <ul style="list-style-type: none"> Role of human sense organs in human safety: eyes, ears, balance. Barotrauma. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Health selection of professional staff. Anatomy and physiology of human beings. | S | Eduard Missoni | 1 | |
| 5. | <ul style="list-style-type: none"> Hypoxia. Workplace health promotion in the aviation sector. | L | Eduard Missoni | 2 | |



| | | | | | |
|-----|---|---|----------------|---|--------|
| | <ul style="list-style-type: none"> Transport of passengers with medical conditions. | S | Eduard Missoni | 1 | |
| 6. | <ul style="list-style-type: none"> SHELL model. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Man within the ergonomic system - Basics. | S | Eduard Missoni | 1 | |
| 7. | <ul style="list-style-type: none"> Stress: definition and stress models. Aftermath of stress. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Environmental factors in aviation traffic. | S | Eduard Missoni | 1 | |
| 8. | <ul style="list-style-type: none"> Electromagnetic radiation and its effect on the human organism. Types of protection. | L | Eduard Missoni | 2 | EXAM 1 |
| | <ul style="list-style-type: none"> High voltage electric power and its effects on humans. First aid after electric shock. | S | Eduard Missoni | 1 | |
| 9. | <ul style="list-style-type: none"> Automation in Aviation (ATC). Full or partial automation. Reasons for automation. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Principles and basics of human body examination. | S | Eduard Missoni | 1 | |
| 10. | <ul style="list-style-type: none"> Illusions and disorientation. The importance of a person's psychological state. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Medical interventions in aviation traffic. | S | Eduard Missoni | 1 | |



| | | | | | |
|-----|--|---|----------------|---|---|
| 11. | <ul style="list-style-type: none"> Injuries: slight, serious and fatal. Mechanical, thermal and chemical injuries. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Procedures regarding an injured traffic participant. Reanimation. | S | Eduard Missoni | 1 | |
| 12. | <ul style="list-style-type: none"> Drinking, drugs, fatigue and aviation. Telemedicine and telecare. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Performing first aid procedures. Submission of seminar papers. | S | Eduard Missoni | 1 | |
| 13. | <ul style="list-style-type: none"> Travellers' health. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Visit to a hospital's emergency department. | S | Eduard Missoni | 1 | |
| 14. | <ul style="list-style-type: none"> Professional, chronic diseases. Diabetes mellitus effects of atmospheric particles on human beings. | L | Eduard Missoni | 2 | |
| | <ul style="list-style-type: none"> Gathering data and observations on specific body parts of an injured traffic participant. | S | Eduard Missoni | 1 | |
| 15. | <ul style="list-style-type: none"> Bioterrorism. | L | Eduard Missoni | 2 | Lecturer's signature confirming attendance at classes |
| | <ul style="list-style-type: none"> Organization of emergency medical care. | S | Eduard Missoni | 1 | EXAM 2 |

L = Lectures; AE = Auditory Exercises; LE = Laboratory Exercises; S = Seminars





STUDENT OBLIGATIONS AND EXAMS

Conditions for obtaining signatures:

During the course of the semester, the students will have an option of taking one test. This test consists of theoretical questions in which it is possible to achieve a maximum of 40 points. Students which achieve a total of 20 points or more, have an option of taking the second test. Students which achieve a total of 20 points or more on the second test are exempt from a written exam. Students that do not achieve a minimum of 20 points have to take a written exam.

The written and oral exam is provided for all students, regardless. To pass the written exam, it is necessary to answer 51% of questions correctly, and the scoring system is shown in Tables 1 and 2.

Students are required to attend lectures and exercises. Students that at the end of semester have a minimum of 80% of attendance get 20 points (10 points for lectures and 10 points for exercise attendance). Students which do not achieve those points have to repeat the course. In the case of justified absences (for more than 3 times during lectures and more than 3 times for exercises), students have to submit medical records or other official records (which are subject of verification). After successful verification process students will get 20 points.

LITERATURE

a) Obligatory literature:

1. Missoni E, Zrakoplovna medicina, Udžbenik za studente Fakulteta prometnih znanosti, Zagreb, 2003.; udžbenik za dodiplomsku nastavu.
2. Anthony N. Nicholson,.: The Neurosciences and the Practice of Aviation Medicine, King's College London, UK, 2012.
3. Missoni E. Ljudski čimbenik u prometu, Udžbenik za studente Fakulteta prometnih znanosti, Zagreb, 2017.

b) Recommended literature:

1. Barss P, Smith G, Baker S, Mohan D: INJURY PREVENTION: An International Perspective, Oxford: University Press, 1998.
2. Robertson LR.: Injury Epidemiology: Research and control strategy. 2nd ed., Oxford. University Press, 2011.
3. Dawood R.: Trevelers' Health: How to stay healthy abroad. Oxford: university press, 6th ed., 2010.
4. Missoni E, Nikolić N, Missoni I.: Civil aviation rules on crew flight time, flight duty, and rest: comparison of 10 ICAO member states. Aviat Space Environ Med 2009; 80(2):135-138.
5. Missoni E, Kern J, Missoni I.: Physical Inactivity Changes in Croatia: the CroHort Study, Coll Antropol 2012; 36 (Suppl. 1): 257-259
6. Lulić, Z; Missoni, E; Tomić, R. The Relevance of GHG Emissions from Motor Vehicles. Transactions of FAMENA, 37 (2013), 2; str. 39-56.
7. Missoni E, Bogović I, Vuković-Dojčinovski N, Stančić M. Medical emergencies in commercial air transportation. Promet – Traffic – Traffico 2006;18(4):301-304.





METHODOLOGY OF THE IMPLEMENTATION OF THE COURSE PLAN

1. LECTURES

Lectures follow specific topics from compulsory literature and are performed using Power Point presentations (in English). The use of a textbook and recommended literature allows students to prepare the lecture topics in advance. Lectures are published on student's portal on the Faculty's web-page (e-student). The students are encouraged to read the topic of the forthcoming lecture in advance and to take part in the pro-active discussion.

2. SEMINARS

During the seminars the students will learn how to reanimate injured persons. Students will also analyse the example of organization a SHELL model, with the addition of acquiring skills that will enable them to properly manage incapacitated passengers.

Furthermore, learning outcomes will result in students' perception of aviation transport and human performance in systems, procedures, equipment in use applied methods.

Note: Individual and/or group viewing negative written test





3. DOCUMENTATION

The student's attendance record is kept during the semester. Their achievement are recorded by continues monitoring of the information system ISVU. All tests are kept in the lecturer's file for one year.

4. SCORING SYSTEM

Table 1 The scoring system for the monitoring of students and explained credit values in ECTS credits

| no | Segment: | Required credits to be achieved: | | Remark: | ECTS credits |
|----------|------------------------------|----------------------------------|--------------------|--------------------------------|-------------------|
| | | Min. | Max. | | |
| 1. | Presence in lectures: | 10 | 10 | Presence \geq 70% | 1 |
| 2. | Seminar paper | 20 | 20 | | 1 |
| 3. | Written exam (terms): | 10 | 20 | | 1 |
| 4. | The verbal part of the exam: | / | / | Theoretical part with lectures | 1 |
| Σ | Overall points: | Σ 40 | Σ 50 | Overall ETCS points: | Σ 4 |





Table 2 - Explanation of the credit values in evaluations

| CREDITS: | Estimate based on attendance, seminar paper and two colloquies (or written exam) - [4 ECTS]: | The final score [4 ECTS]: |
|----------|--|---|
| 40 - 45 | Sufficient (2) | Exemption from the written part of the exam, the final score after oral exam |
| 46 - 50 | Good (3) | |
| 51 - 55 | Very good (4) | |
| 56 - 60 | Excellent (5) | Exemption from verbal parts of exam |

All 4 ECTS can be gained in total only if the student has received a positive opinion on the oral part of the exam, or according to Table 2 is exempt from free verbal parts of the exam.

Information for students (scoring system, implementation plan, learning outcomes, syllabus, literature, consulting teachers, announcement of results of examinations or colloquium, and all other information):

- <https://moodle.srce.hr/2022-2023/>
- <http://www.fpz.unizg.hr>

Student assistants: Additional individual work with the students through individual consultations for assignments from auditory exercises and / or research designs from laboratory exercises, for optional homework, as well as for insight into the negatively written part of the exam.

Prof. **Eduard Missoni**, M.D., Ph.D.

