

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE**NATIONAL AVIATION UNIVERSITY**

Faculty of Transport, Management and Logistics

Air Transportation Management Department

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«06» 09 2023

APPROVED

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«06» 09 2023



Quality Management System
COURSE TRAINING PROGRAM

on

«Reliability and Efficiency Management of Transport Systems and Technologies»

Educational Professional Program: «Air Transportation Management»

Field of study: 27 «Transport»

Speciality: 275 «Air Transport Technologies»

Specialization: 275.04 «Air Transport Technologies»

Training Form	Semester	Total (hours/credits ECTS)	Lectures	Practicals	Lab. classes	Self Study	HW/CGP	TP/Cp	Semester Grade
Full-time:	2	120/4,0	18	—	18	84	-		Graded Test 2s

Index CM-7-275/23-3.5

QMS NAU CTP 19.01-01-2023



Course Training Program on «Reliability and Efficiency Management of Transport Systems and Technologies» is developed on the basis of the Educational Professional Program «Air Transportation Management», Master Curriculum and Extended Master Curriculum №CM-7-275-1/23, №ECM-7-275-1/23 for Speciality 275 «Transport Technologies», Specialization 275.04 «Air Transport Technologies» and corresponding normative documents.

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INTRODUCTION

Course Training Program on «Reliability and Efficiency Management of Transport Systems and Technologies» is developed based on the "Methodical guidance for the subject course training program", approved by the order № 249/од, of 29.04.2021 and corresponding normative documents.

1. EXPLANATORY NOTES

1.1. Place, aim, objectives of the subject.

This training course is the theoretical basis of knowledge and skills for mastering technological subjects of specialists training in the field of transportation management and transport systems.

The purpose of teaching this subject is to form a system of scientific knowledge and practical skills of specialists in transport technology in the field of efficient functioning of transport systems and technologies and air transportation.

The objectives of studying the discipline are:

- mastering the basic concepts in the field of air transport systems;
- mastering the methodology and methods of analysis of transport systems;
- mastering the basic principles and techniques of modeling processes in transport systems and decision-making of varying complexity;
- formation of skills of system analysis on transport.

1.2. Results of mastering the training course

- Search for the necessary information in the scientific and technical literature, databases, other sources, analyze and objectively evaluate information in the field of transport systems and technologies and related crosssectoral issues;

- Freely discuss in state and foreign languages issues of professional activity, projects and research in the field of transport systems and technologies orally and in writing;

- Make effective decisions in the field of transport systems and technologies, taking into account technical, social, economic and legal aspects, generate and compare alternatives, assess the necessary resources and constraints, analyze risks;

- Develop new and improve existing transport systems and technologies, define development goals, existing constraints, efficiency criteria and scope;

- Manage complex technological and production processes of transport systems and technologies, including unpredictable and those that require new strategic approaches;

- Use specialized software for analysis, development and improvement of transport systems and technologies;

- Investigate theoretical and experimental models for assessing the reliability and efficiency of transport technologies by mode of transport.

1.3. Competencies of mastering the training course

- Ability to motivate people and move towards a common goal;
- Ability to search, process and analyze information from various sources;
- Ability to develop and manage projects;
- Ability to generate new ideas (creativity);
- Ability to study and manage the operation of transport systems and technologies;
- Ability to identify and apply promising areas of modeling of transport processes;
- Ability to manage freight by mode of transport;
- Ability to manage passenger traffic by mode of transport;
- Ability to use specialized software to solve complex problems in the field of transport systems and technologies;

- Ability to apply modeling and optimization methods to study and improve the efficiency of aviation transport systems and their management processes.

1.4. Interdisciplinary connections

This training course is based on knowledge from the following subjects: «Methodology of Applied Research in the Field of Transport Technologies (by modes)», «Project Management in Transport Industry»,

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«Management in Integrated Transport Systems» and is a base for mastering such subject as: «Forwarding Activity», «Air Transportation Engineering», «Mathematical Methods of Modeling and Optimization of Transport Systems and Processes», «Course Project «Project Management in Transport Industry»».

2. ACADEMIC CURRICULUM OF THE SUBJECT

2.1. Content of the subject

Training material of the subject is structured according to a module principle and consists of one educational module, namely

- **educational module № 1 «Reliability and Efficiency Management of Transport Systems and Technologies»**, that is logically complete, relatively independent, holistic part of the subject, learning of which provides module test and analysis of its implementation.

2.2. Modular structuring and integrated requirements for each module

Module № 1 «Reliability and Efficiency Management of Transport Systems and Technologies»

Integrated requirements to the Module №1:

Know:

- basic concepts and definitions of the theory of transport systems and technologies and their importance in the management of modern transport organizations;
- directions of use of modern technologies in systems of effective management of the enterprise;
- structure, functions and capabilities of air transport systems;
- prospects for the development of modern technologies and transport systems.

Learning outcomes:

- to study theoretical and experimental models for assessing the reliability and efficiency of transport technologies;
- plan the stages of development and implementation of methods for modeling and optimization of transport systems in the activities of the organization;
- research and manage the functionality of transport systems and technologies;
- apply modeling and optimization methods to study and improve the efficiency of air transport systems and their management processes.

Topic 1. The purpose and objectives of the discipline. Basic concepts and definitions. The concept of system. Classification of systems. Terms and concepts in the field of systems approach. Properties of systems and their use.

Topic 2. The concept of efficiency and reliability of transport systems in the organization of air transportation. A systematic approach in the study of air transport systems. Determining the main stages of the study. The tree of the purposes of functioning of air transport system. Selection of efficiency criteria.

Topic 3. Methods of studying the laws of operation of air transport systems. Application of the theory of complex networks in the study of the functioning of air transport systems. Application of regression analysis to forecast demand. General provisions for evaluating the effectiveness of automation of production processes of airlines.

Topic 4. Description of the air transport system. The structure of the air transport system and the functions of its elements. Demand for air transportation. Network of air routes. Airlines. Airports. Organization of air traffic.

Topic 5. Analysis of the air transport system of Ukraine. Overview of transport and logistics infrastructure. Analysis of indicators of functioning of elements of the air transport system of Ukraine. Demand for air transportation. Analysis of performance indicators of airlines. Determining the structure of the network of air routes.

Topic 6. Modeling the operation of air transport systems. Forecasting the demand for air transportation. Modeling the operation of airports. Strategies for the development of the regional network of airports. Step-by-step method of managing the development of the airport network. Optimization of passenger service system parameters at airports.

Topic 7. Modeling the operation of airlines and their subsystems. Decomposition of the network of air routes. Methods of planning the frequency of flights on the airline's route network. Models of airline revenue optimization. Organizational and technological conditions of the air carrier.

Topic 8. Methods for determining the economic efficiency of air transport systems.

Determination of profit, profitability of air transportation. The task of managing the profitability of flights, realtime pricing (Yield Management Model). Estimation of economic efficiency of aircraft leasing.

2.3. Structure of the subject

№	Theme	Total, hours			
		Total	Lectures	Labs	Self-study
1	2	3	4	5	6
Module № 1 «Reliability and Efficiency Management of Transport Systems and Technologies»					
1.1	The purpose and objectives of the subject .	2 semester			
		13	2	2	9
1.2	The concept of efficiency and reliability of transport systems in the organization of air transportation.	13	2	2	9
1.3	Methods of studying the laws of operation of air transport systems	13	2	2	9
1.4	Description of the air transport system.	13	2	2	9
1.5	Analysis of the air transport system of Ukraine	13	2	2	9
1.6	Modeling the operation of air transport systems	14	2	2	10
1.7	Modeling the operation of airlines and their subsystems	13	2	2	9
1.8	Methods for determining the economic efficiency of air transport systems	16	2	2	10
1.9	Module Test №1	12	-	2	10
Total by the Module № 1		120	18	18	84
Total by the subject		120	18	18	84

3. BASIC CONCEPTS OF GUIDANCE ON THE SUBJECT

3.1. Teaching methods

During teaching the subject the following methods of learning are used:

- explanatory-illustrative method;
- method of problem statement;
- reproductive method;
- research method.

Implementation of these methods is carried out during lectures, demonstrations, independent problems solution, work with educational literature, analysis and problem solving.

3.2. List of references

Basic literature:

3.2.1. Kuipers, S; Cannegieter, SC; Middeldorp, S; Robyn, L; Buller, HR; Rosendaal, FR (2017). "The absolute risk of venous thrombosis after air travel: a cohort study of 8,755 employees of international organisations". PLOS Med. 4 (9): p290.

3.2.2. Borken-Kleefeld, Jens; Berntsen, Terje; Fuglestad, Jan (2010). "Specific Climate Impact of Passenger and Freight Transport". Environ. Sci. Technol. 44 (15): 5700-5706. doi:10.1021/es9039693.

3.2.3. Акімова Т.А. Методика визначення конкурентоспроможності аеропорту. / Т.А. Акімова // Вісник Хмельницького національного університету. - 2018. - №15. - С. 234-238

3.2.4. Транспорт і зв'язок України - 2018. Статистичний збірник [Текст] / за ред. Н.С. Власенко. - К.: ТОВ «Август Трейд» - 272с.

3.2.5. Марінцева К.В. Наукові основи та методи ефективного функціонування авіатранспортних систем: монографія/ К.В. Марінцева. - К.: НАУ, 2014. - 504с.

Additional literature:

Steven Shaw. Airline Marketing and Management. British Library Cataloguing in Publication Data Shaw, Stephen, 2017. - Airline marketing and management. - 6th ed. 1. Airlines - Management 2. Airlines - Marketing I. Title/ by Stephen Shaw. Ashgate Publishing Company. - P. 336

3.3. Internet resources

- 3.3.1. www.avia.gov.ua
- 3.3.2. <https://mtu.gov.ua/timeline/Aviatransport.html>
- 3.3.4. <https://ips.ligazakon.net/document/TM028161>
- 3.3.5. <https://visnyk-geo.knu.ua/wp-content/uploads/2016/04/13-63.pdf>

4. RATING SYSTEM OF KNOWLEDGE AND SKILLS ASSESSMENT

4.1. Assessment of certain kinds of student academic work is carried out in accordance with table 4.1.

Table 4.1

Kind of Academic Work	Maximum Grade Values
2 semester	
Module № 1 «Reliability and Efficiency Management of Transport Systems and Technologies»	
kind of Academic Work	points
Carrying out labs (106 x 8)	80 (total)
<i>For admission to complete module test №1, a student must receive not less than</i>	<i>48 points</i>
Module test № 1	20
Total by the Module №1	100
Total by the subject	100

The Graded Test Grade is determined (in grades and on a national scale) based on the results of all kinds of academic activities during the semester.

4.2. Completed types of educational work are credited to the student, if he received a positive rating for them.

4.3. The sum of rating assessments received by the student for certain types of completed academic work is the current modular rating assessment, which is recorded in the module control.

4.4. The Total Semester Grade is listed in the national and ECTS scale scores.

4.5. The final modular rating obtained by the student based on the results of the course defense and defense in points, on the national scale and ECTS scale is entered in the module control, as well as in the study card, individual student curriculum and Diploma Supplement, for example, as follows: **92 / Excellent / A, 87 / Good / B, 79 / Good / C, 68 / Sat./D, 65 / Sat./E, etc.**

4.6. The Total Grade for the subject is equal to the average grade from Total Semester Grades with its further transformation into national scale and ECTS system.

The Total Grade is recorded to the Diploma Appendix

(Ф 03.02 – 01)

АРКУШ ПОШИРЕННЯ ДОКУМЕНТА

№ прим.	Куди передано (підрозділ)	Дата видачі	П.І.Б. отримувача	Підпис отримувача	Примітки

(Ф 03.02 – 02)

АРКУШ ОЗНАЙОМЛЕННЯ З ДОКУМЕНТОМ

№ пор.	Прізвище ім'я по-батькові	Підпис ознайомленої особи	Дата ознайом- лення	Примітки

(Ф 03.02 – 04)

АРКУШ РЕЄСТРАЦІЇ РЕВІЗІЇ

№ пор.	Прізвище ім'я по-батькові	Дата ревізії	Підпис	Висновок щодо адекватності

(Ф 03.02 – 03)

АРКУШ ОБЛІКУ ЗМІН

№ зміни	№ листа (сторінки)				Підпис особи, яка внесла зміну	Дата внесення зміни	Дата введення зміни
	Зміненого	Заміненого	Нового	Анульо- ваного			

(Ф 03.02 – 32)

УЗГОДЖЕННЯ ЗМІН

	Підпис	Ініціали, прізвище	Посада	Дата
Розробник				
Узгоджено				
Узгоджено				
Узгоджено				