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NATIONAL AVIATION UNIVERSITY
Educational and Research Institute of Airports
Computer Technologies of Design and Graphics Department

AGREED
Director of the Educational and
Research Aerospace Institute
_____ V. Shmarov
«___»_____2016.

APPROVED
Vice-Rector for Academics
and Educative Activity
_____ T.Ivanova
«12»_____12____2016.

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Quality Management System

COURSE TRAINING PROGRAM
on
«Engineering and Computer Graphics»

Field of Study: 13 «Mechanical Engineering»
Speciality: 134 « Aviation and Space Rocket Technology »
Specializations: «Airplanes and Helicopters »
«Aircraft Equipment»

Year of Study – 1st Semester – 2nd

Lectures – 17
Laboratory classes – 51 Graded Test – 2nd semester
Self-study – 82
Total (hours/ECTS credits) – 150/5,0
Homework (1) – 2nd semester

Index ECB -1-134/16-2.1.9

QMS NAU CTP 10.01.03-01--2016

The Course Training Program on «Engineering and Computer Graphics» is based on the Bachelor Extended Curriculum № ECB -1-134/16 for Speciality 134 «Aviation and Space Rocket Technology» and Specializations: «Airplanes and Helicopters», «Aircraft Equipment», Syllabus for this Subject, Index CB -1-134/16-2.1.9 approved by the Rector «12» ____12___ 2016 and correspondent normative documents.

The Course Training Program has been developed by:

associate professor of the ComputerTechnologies
of Design and Graphics Department _____ M. Makarenko

professor of the ComputerTechnologies
of Design and Graphics Department _____ O. Bashta

assistant professor of the ComputerTechnologies
of Design and Graphics Department _____ O. Dzhuryk

Discussed and approved by the Computer Technologies of Design and Graphics Department, Minutes № ___ of «___»_____2016.

Head of the Department _____ Y. Kovalyov

Discussed and approved by the Graduate Department for the Speciality 134 «Aviation and Space Rocket Technology» and Specialization «Aircraft Equipment» – Aircraft Design Department, Minutes № ___ of «___»_____2016.

Head of the Department _____ S. Ignatovych

Discussed and approved by the Graduate Department for the Speciality 134 «Aviation and Space Rocket Technology» and Specialization «Airplanes and Helicopters» – Hydraulic & Gaseous Systems Department, Minutes № ___ of «___»_____2016.

A.h. of the Department _____ V.Badakh

Discussed and approved by the Scientific-Methodological-Editorial Board of the Educational and Research Institute of Airports, Minutes №_____ of «_____»_____2016.

Head of the SMEB _____A. Bieliatynskyi

Director of the Center
of Advanced Technologies

_____ V. Kazak

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Contents

1.INTRODUCTION

The Course Training Program on «Engineering and Computer Graphics» is developed on the basis of Bachelor Extended Curriculum and "Methodical instructions for development and issuance of syllabus and course training programs of the subjects" enacted by order as of 16.06.2015 №37/роз.

Rating system assessment (RSA) is an integral part of Course Training Program and involves determining the quality of a student performed all kinds of classroom and self- study of work and acquired his knowledge and skills through assessment in scores results of this work in the current, modular and semester control followed by multi-transfer assessment scale to according the national scale and scale ECTS.

RSA provides use of modular Grades (current, control, final) as well as Examination or a Graded Test, the Total Semester and Total Grades.

2. SUBJECT CONTENT

2.1. Training schedule of the subject

№	Topic	Academic Hours			
		All	Lectures	Labora-tory classes	Self-study
1	2	3	4	5	6
2 Semester					
Module №1 «Projection bases of images»					
1.1	Introduction. Types of products. Types and completeness of design documentation. Basic rules of forming of the design documentation	8	2	2	4
1.2	Projective basics of imaging	4	2	-	2
1.3	Conventions and simplify image	4	2	-	2
1.4	Construction of views	4	-	2	2
1.5	Construction of simple cuts.	4	-	2	2
1.6	Construction of complex cuts.	4	-	2	2
1.7	Construction of sections	4	-	2	2
1.8	Application packages of interactive graphics	4	2	-	2
1.9	Commands of drawing of geometrical примітивів.	4	-	2	2
1.10	Commands of editing of geometrical примітивів	4	-	2	2
1.11	Construction of contour of te технічної деталі	4	-	2	2
1.12	Homework (part №1)	4	-	-	4
1.13	Module test №1	3	-	2	1
Total for the module №1		**55**	**8**	**18**	**29**
Module №2 «Development of working design documentation»					
2.1	Drawing details	4	2	-	2
2.2	Features drawings of details of the "shaft".	4	-	2	2
2.3	Features drawings of details of the "body"	4	-	2	2
2.4	Drawings detail using the standards of 4 group ЄСКД.	4	-	2	2
2.5	Algorithms of execution drawings of details in graphic editor AutoCAD environment	4	-	2	2
2.6	Types of connections components of the product. Their images and symbols	4	2	-	2
2.7	Detail drawings of connections with standard fasteners with the thread.	4	-	2	2
2.8	Drawings aviation connections on pipelines cone	4	-	2	2
2.9	Drawings of non-detachable connections	4	-	2	2

1	2	3	4	5	6
2.10	Drawings detailing the general form of assambly unit	4	2	-	2
2.11	Reading general view drawings.	4	-	2	2
2.12	Design drawings of the details of the "body" using general view drawings.	4	-	2	2
2.13	Design drawings of the details of the " nut" using the general view drawings.	4	-	2	2
2.14	The working design documentation for assembly units	4	2	-	2
2.15	Assembly drawings	3	1	-	2
2.16	Development of structural separation schemes and the specification of the assembly unit	2	-	2	-
2.17	Execution drawings of detail «body»	5	-	2	3
2.18	Implementation details of the drawings with the thread	5	-	2	3
2.19	Implementation of assembly drawing ofassambly unit using the drawings of details	4	-	2	2
2.20	Schemes. Types of schemes. General requirements for the implementation of schemes	6	-	2	4
2.21	Development of principal hydraulic circuit	6	-	2	4
2.22	Homework (part №2)	4	-	-	4
2.23	Module test №2	2	-	1	1
Total for the module №2		**95**	**9**	**33**	**53**
Total for the2nd semester		**150**	**17**	**51**	**82**
Total for the discipline		**150**	**17**	**51**	**82**

2.1.1. Homework

Homework (HW) is executed in the second semester, in accordance with the ratified methodical recommendations with the purpose of fixing and deepening of theoretical knowledge and abilities of students and is is the important stage in mastering of educational material.

Homework № 1 is executed on the base of educational material given to Self-study students, and is a component of the module № 1 "Projective bases of construction of image " (part №1) and module № 2 “Developing working design documentation " (part №2).

The purpose of homework is in individual consolidate the theoretical knowledge of engineering drawing and receiving skills to develop a working design documentation for details and assembly units as using drawing tools and environments in graphic editor AutoCAD .

Implementation, registration and defense of Homework, is carried out by a student in an individual order in accordance with methodical recommendations.

The time required for implementation of HW - up to 8 hours of Self- study.

3. BASIC CONCEPTS OF GUIDANCE ON THE SUBJECT

3.1. List of references

Basic literature

3.1.1. *Михайленко В .Є.* Інженерна та комп'ютерна графіка: підручник / В. Є.Михайленко, В. М. Найдиш, А. М. Підкоритов, І. В. Скидан; за ред. В. Є.Михайленка. – К.: Вища шк. 2004. –342с.

3.1.2. *Ванін В .В.* Оформлення конструкторської документації: навч. посіб. 4-те вид., випр. і доп. / В. В. Ванін, А. В. Бліок, Г. О. Гнітецька. – К.: Каравела, 2012. – 200 с.

3.1.3. *Макаренко М.Г.* Інженерна графіка: посібник / М.Г. Макаренко. – К.: НАУ. 2014. – 180 с.

3.1.4. *Макаренко М.Г.*:Комп’ютерна графіка: практикум / М.Г. Макаренко. – К.: НАУ. 2013. – 76 с.

3.1.5. ЕСКД. Основные положения (с изменениями) —М.: Издательство стандартов, 1975. – 350 с.

3.1.6. ЕСКД. Общие правила выполнения чертежей (с изменениями) –М.: Издательство стандартов, –М.: 1991. – 236 с.

3.1.7. ЕСКД. Правила выполнения чертежей различных изделий (с изменениями), –М.: Издательство стандартов, 1982. – 223 с.

3.1.8. ЕСКД. Правила выполнения схем. – М.: Изд-во стандартов, 1987. – 135 с.

Additional literature

3.1.9. *Богданов В. М.* Інженерна графіка: довідник / В. М. Богданов, А. П. Верхола, Б. Д. Коваленко та ін.; за ред. А. П. Верхоли. – К.: Техніка, 2001. – 268 с.

3.1.10. *Макаров В.І.* Нарисна геометрія. Інженерна та комп'ютерна графіка: навч. посіб. / В.І. Макаров, В.Г. Шевченко, М.Г. Макаренко та ін. – К.: Книжкове вид-во НАУ, 2006, – 259 с.

3.1.11. *Ковальов Ю.М.* Прикладна геометрія: підручник / Ю. М. Ковальов, В.М. Верещага. – К.: ДІЯ, 2012. – 472 с.

3.2. List of basic guidance materials for the subject

№	Name	Index of Topics where Guides are Used	Quantity
1.	Multimedia course	1.1 –1.3, 2.1 – 2.5	Electronic version
2.	Practicum for preparing laboratory classes	1.3, 2.1	100 copies and electronic version
3.	Manual	1.1 –1.2, 2.1 – 2.5	100 copies and electronic version

4. RATING SYSTEM OF KNOWLEDGE AND SKILLS ASSESSMENT

4.1. Grading of different kinds of academic work performed by a student is done in accordance with Table 4.1.

Table 4.1

Grading of different kinds of academic activities performed by a student

2 semester				
Module №1		**Module №2**		Max Grade
Kind of Academic Activities	Max Grade	Kind of Academic Activities	Max Grade	
Performance and deference of laboratory classes №1.1 – 1.8	16	Performance and deference of laboratory classes №2.1 – 2.16	32	
Performance and deference of HW (part №1)	5	Performance and deference of Homework (part №2)	5	
For carring out module test №1, a student must receive not less than 13 values		*For carring out module test №2, a student must receive not less than 22 values*		
Carrying out Module Test №1	15	Carrying out Module Test №2	15	
Total for module №1	**36**	**Total for module №2**	**52**	
Semester Graded Test				**12**
Total 2nd Semester Grade				**100**

4.2. The completed curricular activity is accounted if the student received a positive mark (Table 4.2).

4.3. The grades a student has been given for the different kinds of academic work are summed up and the result constituting a Current Module Grade is entered into the Module Grade Register.

Table 4.2

Correspondence between the Grades and the National Scale

Grades				National scale
Performance and deference of laboratory classes		Performance and deference of Homework (parts №1, №2)	Carrying out Module Test	
14 – 16	29 – 32	5	14 – 15	Excellent
12 – 16	24 – 28	4	11 – 13	Good
10 – 11	19 – 23	3	9 – 10	Satisfactory
under 10	under 19	under 3	under 9	Bad

4.4. The Current Module Grade and the Module Test Grade together make up a Total Module Grade(Table 4.3), whose correspondence to the National Scale is entered into the Module Grade Register.

Table 4.3

Correspondence between the Total Module Grades and the National Scale

Module №1	Module №2	National scale
33 – 36	47 – 52	Excellent
27 – 32	39 – 46	Good
22 – 26	31 – 38	Satisfactory
менше 22	менше 31	Bad

4.5. The Semester Module Grade is calculated as the sum of the Total Module Grades. The correspondence between Semester Module Grade values and the National Scale is given in Table 4.4.

Table 4.4

Correspondence between the Semester Module Grades and the National Scale

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Grades	National Scale
79-88	Excellent
66-78	Good
53-65	Satisfactory
under 53	Bad

Table 4.5

Correspondence between the Graded Test Grades and the National Scale

National Scale	
Graded Test	
12	Excellent
10	Good
8	Satisfactory
-	-

4.6. The Semester Module Grade and the Graded Test Grade together make up a Total Semester Grade whose correspondence to the National Scale and the ECTS Scale is shown in Table 4.6.

Table 4.6

Correspondence of the Total Semester Grades to the National Scale and the ECTS System

Total Semester Grades	National Scale	ECTS System	
		ECTS Grade	Explanation
90-100	**Excellent**	**A**	**Excellent** (excellent performance with insignificant shortcomings)
82 – 89	**Good**	**B**	**Very Good** (performance above the average standard with few mistakes)
75 – 81		**C**	**Good** (good performance altogether with a certain number of significant mistakes)
67 – 74	**Satisfactory**	**D**	**Satisfactory** (performance meets the average standards)
60 – 66		**E**	**Sufficient** (performance meets the minimal criteria)
35 – 59	**Bad**	**FX**	**Bad** (bad performance; a second testing is required)
1 – 34		**F**	**Bad** (very bad performance; a student shall retake the course)

4.7. The Total Semester Grade is entered into the Examination Register, educational card and into a student's record book in according to National Scale and ECTS Scale.

4.8. The Total Semester Grade is entered into a student's record book and educational card, for example: ***92/Ex/A, 87/Good/B, 79/Good/C, 68/Sat/D, 65/Sat/E***, etc.

4.9. The Total Grade of the discipline, that is taught during the one semester, is equal to the Total Semester Grade.

The Total Grade of the discipline is entered to the Appendix of Diploma.

(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	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				