"1 DECEMBRIE 1918" UNIVERSITY,
ALBA IULIA, ROMANIA

ON COMPUTERISING GEODETIC SURVEYS IN THE CONTEXT OF HIGHER EDUCATION

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INTRODUCTION

The legislative framework for assuring the quality of Romanian higher education:

-Law 288/24 June 2004 on the organization of higher education;

-The Government Decision 1175/06 Sept. 2006 on the organization of undergraduate studies and on the approval of the list containing subject areas and undergraduate study programmes;

-The Government Decision 404/29 March 2006 on the organization of higher education;

-Law 87/10 Apr. 2006 on the approval of the Government Emergency Ordinance No. 75/2005 regarding the assurance of education quality.

CONTENTS OF EDUCATION AS A PROCESS

The length of studies and the volume of teaching activities:

Indicator	*Full-time courses, Distance education, Part-time courses*	*Evening classes*
Length of studies, of which:	8 sem.	10 sem.
Minimum semester length	14 weeks	14 weeks
Number of hours/ week	26 –28	21 – 22
Added length of practical activities	4 – 6 weeks	4 – 6 weeks
Length of practical activities dedicated to the preparation of the Thesis/Diploma project	2 – 3 weeks (during the last year of studies)	2 – 3 weeks (during the last year of studies)

CONTENTS OF EDUCATION AS A PROCESS

Categories of disciplines:

-fundamental disciplines, minimum 17%;

-disciplines of the study area minimum 38 %;

-specialty disciplines, minimum 25 %;

-complementary disciplines, maximum 8%.

A COMPARATIVE CURRICULA STUDY

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Cr. No.	Designation of Discipline	Type of Discipline	Tuition and individual study hours: Number of weeks	Tuition hours: Teaching activities: Course	Seminar	Laboratory	Project	Total hours/week	Total hours/semester	Individual study: Total hours/week	Total hours/semester	Number of credits
	1st YEAR											
	1ST SEMESTER											
1	Mathematical analysis	F	14	2	1	-	-	3	42	3	42	**4**
2	Linear algebra	F	14	1	1	-	-	2	28	3	42	**3**
3	Descriptive geometry	F	14	2	-	2	-	4	56	3	42	**4**
4	Physics	F	14	2	-	1	-	3	42	2	28	**4**
5	Topography 1	F	14	2	-	2	-	4	56	3	42	**5**
6	Chemistry	F	14	2	-	2	-	4	56	3	42	**4**
7	Geodetic instruments and surveying methods	D	14	2	-	2	-	4	56	3	42	**4**
	COMPLEMENTARY DISCIPLINES											
8	Foreign language 1	C	14	-	2	-	-	2	28	1	14	**2**
9	Sport	C	14	-	2	-	-	2	28	0	0	-
	TOTAL – 1st semester	-	**14**	**13**	**6**	**9**	**0**	**28**	**392**	**21**	**294**	**30**
	2ND SEMESTER											
1	Special mathematics	F	14	2	1	-	-	3	42	1.5	21	**3**
2	Differential and analytical geometry	F	14	2	1	-	-	3	42	1.5	21	**3**
3	Technical and map drawing	F	14	2	-	1	-	3	42	2	28	**3**
4	Topography 2	F	14	2	-	2	2	6	84	3	42	**6**
5	Measurements compensation and statistics 1	F	14	2	-	1	-	3	42	1.5	21	**4**
6	General geology	D	14	2	-	2	-	4	56	1.5	21	**3**
7	Geography	D	14	2	-	-	-	2	28	1.5	21	**3**
	COMPLEMENTARY DISCIPLINES											
8	Foreign language 2	C	14	-	2	-	-	2	28	1.5	21	**2**
9	Sport	C	14	-	2	-	-	2	28			-
	TOTAL – 2nd semester (without the practical activities)	-	**14**	**14**	**6**	**6**	**2**	**28**	**392**	**14**	**196**	**27**
10	Practical activities 1 (Topography)	D	2	-	-	-	-	0	60	30	60	**3**
	TOTAL / YEAR	-	**28**	**27**	**12**	**15**	**2**	**56**	**844**	**65**	**550**	**60**

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Cr. No.	Designation of Discipline	C	S	L	P	SI	TO	CR
	1st Semester							
1.	Higher Mathematics I	2	2	-	-	2	6	4
2.	Algebra	2	-	-	-	2	6	5
3.	Geometric representations of topographical surfaces	2	-	2	-	3	7	5
4.	Physics I	3	-	1	-	2	6	5
5.	Surveying instruments and methods I	2	-	2	-	3	7	5
6.	Physical geography	2	-	-	-	1	3	2
7.	Disciplines of the social sciences and humanities area	2	2	-	-	1	5	3
8.	Foreign Language I	-	(2)	-	-	(1)	(3)	1
9.	Sport I	-	(2)	-	-	-	-	-
	TOTAL 26	**15**	**6**	**5**	**-**	**14**	**40**	**30**
	2nd Semester							
1.	Higher Mathematics II	2	2	-	-	2	6	4
2.	Analytical and differential geometry	2	2	-	-	2	6	4
3.	Physics II	3	-	1	-	2	6	4
4.	Geometric bases of Photogrammetry (GBP)	2	-	1	-	1	4	2
5.	Surveying instruments and methods II	2	-	2	-	2	6	5
6.	Cartographic drawing	-	-	2	-	1	3	2
7.	The basics of physical geodesy I	2	-	-	-	2	4	3
8.	Geodetic astronomy	2	-	1	-	2	5	2
9.	Foreign languages II	-	(2)	-	-	(1)	(3)	1
10.	Sport II	-	(2)	-	-	-	-	-
11.	Practical activities I	3 weeks x 30 hours	-	-	3	C		
	TOTAL 26	**15**	**4**	**7**	**-**	**14**	**40**	**30**

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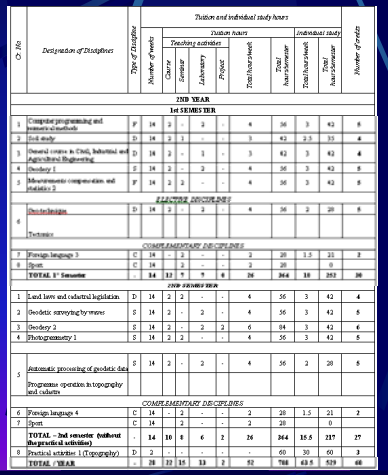
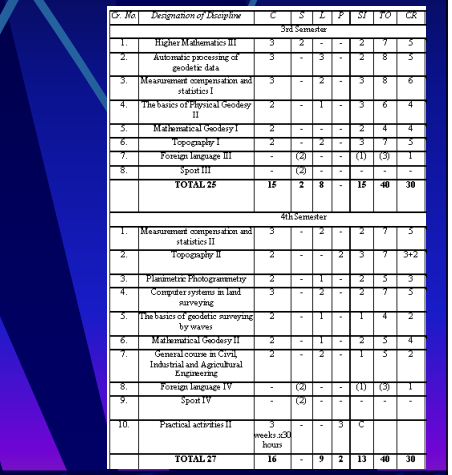
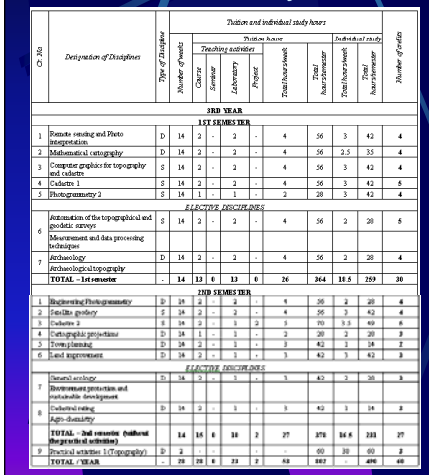
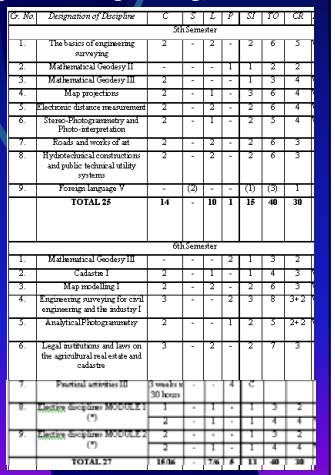


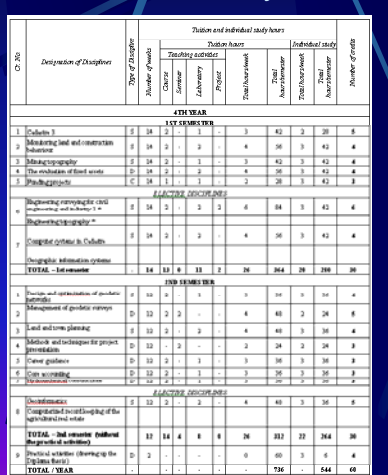
Cr. No.	Designation of Discipline	Cr. No.	Designation of Discipline
	3rd Semester		4th Semester
1.	Higher Mathematics III	1.	Measurement compensation and statistics II
2.	Automatic processing of geodetic data	2.	Topography II
3.	Measurement compensation and statistics I	3.	Planimetric Photogrammetry
4.	The basics of Physical Geodesy II	4.	Computer systems in land surveying
5.	Mathematical Geodesy I	5.	The basics of geodetic surveying by waves
6.	Topography I	6.	Mathematical Geodesy II
7.	Foreign Language III	7.	General course in Civil, Industrial and Agricultural Engineering
8.	Sport III	8.	Foreign language IV
	TOTAL 25	9.	Sport IV
		10.	Practical activities II
			TOTAL 27







Cr. No.	Designation of Discipline	C	S	L	P	SI	TO	CR
	5th Semester							
1.	The basics of engineering surveying	2	-	2	-	2	6	5
2.	Mathematical Geodesy II	-	-	-	1	1	2	2
3.	Mathematical Geodesy III	2	-	-	-	1	3	4
4.	Map projections	2	-	1	-	3	6	4
5.	Electronic distance measurement	2	-	2	-	2	6	4
6.	Stereo-Photogrammetry and Photo-interpretation	2	-	1	-	2	5	4
7.	Roads and works of art	2	-	2	-	2	6	3
8.	Hydrotechnical constructions and public technical utility systems	2	-	2	-	2	6	3
9.	Foreign language V	-	(2)	-	-	(1)	(3)	1
	TOTAL 25	**14**	**-**	**10**	**1**	**15**	**40**	**30**
	6th Semester							
1.	Mathematical Geodesy III	-	-	-	2	1	3	2
2.	Cadastre I	2	-	1	-	1	4	3
3.	Map modelling I	2	-	2	-	2	6	3
4.	Engineering surveying for civil engineering and the industry I	3	-	-	2	3	8	3+2
5.	Analytical Photogrammetry	2	-	-	1	2	5	2+2
6.	Legal institutions and laws on the agricultural real estate and cadastre	3	-	2	-	2	7	3
7.	Practical activities III	3 weeks x 30 hours	-	-	4	C		
8.	Elective disciplines MODULE 1 (*)	1	-	1	-	1	3	2
		2	-	1	-	1	4	4
9.	Elective disciplines MODULE 2 (*)	2	-	-	-	1	3	2
		2	-	1	-	1	4	4
	TOTAL 27	**16/16**	**-**	**7/8**	**5**	**13**	**40**	**30**



Cr. No.	Designation of Discipline	C	S	L	P	SI	TO	CR
	7th Semester							
1.	Space Geodesy I	2	-	2	-	2	6	4
2.	Engineering Photogrammetry	3	-	1	-	3	7	6
3.	Engineering surveying for civil engineering and the industry II	2	-	2	-	2	6	6
4.	Cadastre II	3	-	2	-	3	8	5
5.	Accounting	2	1	-	-	1	4	3
6.	Elective disciplines MODULE 1 (*)	2	-	1	-	1	4	2
		2	-	-	2	1	5	4
7.	Elective disciplines MODULE 2 (*)	2	-	1	-	1	4	4
		2	-	2	-	1	5	2
	TOTAL 27	**16**	**1**	**8/10**	**2/0**	**13**	**40**	**30**
	8th Semester							
1.	The design and optimization of geodetic networks	2	-	-	-	2	4	3
2.	Digital Photogrammetry	2	-	1	-	2	5	5
3.	Remote sensing	2	-	2	-	3	7	5
4.	Land improvement and town planning	2	-	1	-	1	4	3
5.	Monitoring the behaviour of lands and construction works	2	-	1	-	3	6	5
6.	Organizing geodetic works	2	-	2	-	1	5	3
7.	Elective disciplines MODULE 1 (*)	2	-	1	-	1	4	2
		2	-	1	-	2	5	4
8.	Elective disciplines MODULE 2 (*)	2	-	2	-	2	6	4
		1	-	1	-	1	3	2
	TOTAL	**16/16**	**-**	**9/10**	**-**	**15**	**40**	**30**

AUTOMATION OF GEODETIC SURVEYS IN AN EDUCATIONAL CONTEXT

The most important disciplines that will offer competences in computerising geodetic surveys:

-General topography;

-Topographical tools and measurement methods.

AUTOMATION OF GEODETIC SURVEYS IN AN EDUCATIONAL CONTEXT

The most important disciplines that will offer competences in computerising geodetic surveys:

-Computer programming;

-Geodetic surveys by waves;

-Automatic processing of geodetic data;

-The automation of topographic and geodetic surveys;

- Computer graphics for topography and cadastre;

-Satellite geodesy;

-Engineering Photogrammetry.

On Computerising Geodetic Surveys in the Context of Higher Education
Luciana OPREA, Ioan IENCIU – Alba Iulia, ROMANIA
26 – 28 February 2009
Vienna, Austria

CONCLUSIONS AND PROPOSALS

-All these accomplishments are the result of the connection between theory and practice;

-The description of the curricula shows that surveying students, during the four years of study, acquire enough knowledge and practical skills to work with computers and specialized surveying software;

-These skills may increase the quality and productivity of the surveyor's work. They also become a huge advantage when using other computer software and other types of equipment in other surveying-related areas;

-Trough the study of a wide range of topographic equipment and of computer software that are presently used in Romania and abroad, our young engineers are prepared to apply for jobs in Romania or in any member state of the European Union.

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Thank you for your attention!

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