

SYLLABUS

TOPOGRAPHY 1

Course Code: IG 1105

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Ioan IENCIU, PhD

Seminar tutor: Luciana OPREA, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	5

COURSE AIMS:

The final objectives of the course for 1st semest refereas to the preparation of field activities, field recognition, measurement planning, measurements and the calculations. Progress in building surveying and geodetic instruments, positioning the emergence of modern technologies should be presented in the course, meeting the requirements of a modern higher education.

The specific objectives:

- knowledge of surveying equipment;
- making topographic measurements.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

Course contents:

1. Object of discipline;
2. Notions of measurement error theory;
3. Planimetry;
4. Benchmarking;
5. Direct measurement of distances;
6. Angles measuring;
7. Indirect measurement of distances;
8. Triangulation networks;
9. The calculation of triangulation networks orientation;
10. The increasing of triangulation networks.

Laboratory contents:

1. Notion of Safety in Surveying;
2. Math in surveying;
3. Benchmarking alignments, Direct measurement of distances;
4. Theodolite - verification, measurements;
5. Measurement of horizontal angles - Simple Method;
6. Measurement of horizontal angles - method of repetition;
7. Measurement of horizontal angles - method of reiterations;
8. Measurement of horizontal angles - method of horizon tour and binary series;
9. Measurement of vertical angles;
10. Distances measuring - Tacheometric Method;
11. Distances measuring - Parallactic Method;
12. Distances measuring - Trigonometric Method;
13. Electronic measuring distances;
14. Test of the lab.

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

C1. Designing and building networks for space geodetic topographical, cadastral and other engineering works

C5. Determination of displacements and deformations of buildings and lands.

C6. Making cadastre information systems and specialized fields, and their use for real estate advertising works and the property valuation.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Exam at least 2 test subjects - oral / written examination and Partial test (60% of the final grade)

Test of the lab - practical (40% of the final grade)

RECOMMENDED READING:

- Deaconescu, C. - Topografie și desen tehnic, Editura Didactică Pedagogică, București, 1979;
- Dima, N. ș.a. - Topografie minieră, Editura Corvin, Deva, 1996;
- Dima, N. ș.a. – Topografie generală și elemente de topografie minieră, Editura Universitas, Petroșani, 2005;
- Leu, N. I. ș.a - Topografie și Cadastru Editura Universul, 2002;
- L. Oprea, I. Ienciu – Topografie I - îndrumător de laborator, Seria „Didactica”, Universitatea „1 Decembrie 1918”, Alba Iulia, 2009;
- L. Oprea – Topografie - îndrumător de proiect, Seria „Didactica”, Universitatea „1 Decembrie 1918”, Alba Iulia, 2009;
- Pădure, I.; Kovacs L. - Topografie Generală, Editura Risoprint, Cluj Napoca, 2005;
- Russu, A. - Topografie cu elemente de geodezie și fotogrammetrie, Editura Agrosilvică, București, 1968.

SPECIAL MATHEMATICS 1

Course Code: IG 1107

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Prof. Daniel Breaz, PhD

Seminar tutor: Assis. Ioan-Lucian Popa, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	Autumn	Grade	4

COURSE AIMS:

The overall objective of this discipline is to strengthen the concepts of trigonometry and algebra studied in high school, including at the same time, elements of algebra required higher education and other objects.

ENTRY REQUIREMENTS:-**COURSE CONTENTS:**

1. Units of measurement angles and arcs
2. Trigonometric functions sine and cosine. Graphics, accurate values of their properties
3. Tangent and cotangent functions. Formula for $\cos(a-b)$ $\cos(a+b)$ $\sin(a-b)$ $\sin(a+b)$ and formulas derived from them
4. Inverse trigonometric functions
5. Trigonometric equations
6. Sinus and cosines theorems
7. Area of the triangle using different formulas. The flat faces of different areas
8. Vectors, algebraic properties
9. The dot product, vector product
10. Polar coordinates and Cartesian coordinates
11. Complex numbers. Geometric representation of complex numbers. Module of a complex number
12. Operations with complex numbers in trigonometric form
13. The n root of a complex number. De Moivre's Theorem
14. Solve quadratic equations and three with complex coefficients

TEACHING METHODS:

Lecture, discussion, exemplification.

LEARNING OUTCOMES:

In order to obtain credits for this discipline the students have to:

- Know the basic concepts related to measurement units and conversion of degrees angles in radian.
- know how to deal with trigonometric functions, their inverses and solve elementary trigonometric equations
- compute Scalar and vector product compute.
- Operate with complex numbers in trigonometric form and solve quadratic equations of degree two and three with complex coefficients.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Final evaluation – 50%; continuous assessment – 50%.

RECOMMENDED READING:

- R. Barnett, M. Ziegler, K.E. . Byleen, Analytic trigonometry with applications, John Wiley and Sons, 2012
- M. B. Finan, A semester course in trigonometry, Arkansas Tech University, 2003
- D.A. Ross, Master Math: Trigonometry, The Career Press Inc., 2002

GEODESIC INSTRUMENTS AND LAND SURVEYING METHODS

Course Code: IG 1202

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Ioan IENCIU, PhD

Seminar tutor:

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Summer	Grade	4

COURSE AIMS:

The general objectives of this course are: - the ability to collect, manage and process topographic information;
- the ability to adapt to new situations, showing creativity.

Progress in building surveying and geodetic instruments are subject to outstanding achievements in the fields of mechanics, physics, mathematics, electronics, etc.. Responding to this need, the course aims to present the main types of tools used in this field with emphasis on specific instruments surveyor work.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

1. Introduction, object of discipline;
2. Instruments for direct measurement of distances
3. Instruments for angles measuring;
4. Instruments for level difference measuring;
5. Instruments for level difference measuring - verification and calibration;
6. Electronic Instruments - verification, calibration, rectification;
7. Electronic theodolites;
8. Electronic levels;
9. Total Stations;
10. GPS;
11. Instruments for determining the size of surfaces.

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

C2. Making topographical required to develop specific plans and topographic and thematic maps.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Exam at least 2 test subjects - written examination (60% of the final grade)

Test of the lab - practical (40% of the final grade)

RECOMMENDED READING:

- Bianu, V. - Optică geometrică, Editura Tehnică București, 1962;
- Deaconescu, C. - Topografie și desen tehnic, Editura Didactică Pedagogică, București, 1979;
- Ienciu, I.; Oprea, L.; Voicu, G. E.; Borșan, T. – Instrumente geodezice și metode măsurare – îndrumător de laborator, Seria Didactica, Universitatea „1 Decembrie 1918” Alba-Iulia, 2009;
- Neamțu, M.; Ulea, E.; Atudorei, M.; Boceanu, I. - Instrumente Topografice și Geodezice, Editura Tehnică București, 1982;
- Manual de utilizare al stației totale;
- Manual de utilizare al teodolitului electronic;
- Manual de utilizare al GPS.

TECHNICAL AND CARTOGRAPHIC DRAWING

Course Code: IG 1203

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Popa Dorin Victor, PhD

Seminar tutor: Popa Dorin Victor, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	II	Grade	4

COURSE AIM:

Knowing the basics on the technical design's purpose and importance

COURSE CONTENTS:

1. General considerations; introduction to technical drawing
2. General standards used in technical drawing
3. Indicators and folding in technical drawing
4. Scales used
5. Projections layout and representation
6. Views and sections representation
7. Sections classification and tears/hatches representation
8. Dimensioning in the technical design
9. Elements of technical and cartographic drawing
10. Elements of mapping writing
11. Mapping the land originals of topographic maps and plans

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES

- Knowing and applying the general standards of technical design
- Developing the technical writing skills
- Developing skills for representing various objects in view and in section
- The ability to draw up the sketch and the survey for an existing object
- Acquiring the ability to draw up the plan for drafting the maps and the topographical plans

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written test examination - 60%, Verification during the semester- 40%.

RECOMMENDED READING:

- Leu, I.N. si colab, *Topografie si cadastru agricol*, Didactic and Pedagogic Publishing House, Bucharest, 2000
- Achim, M, - *Geometrie descriptiva si desen tehnic*, Didactica series, Alba Iulia, 2004;
- Ionasec, A., Radulescu, M si colab – *Topografie si Desen Tehnic*, Didactic and Pedagogic Publishing House, Bucharest, 1980.
- Precupetiu, P. si colab, T, *Desen Tehnic Industrial*, Didactic and Pedagogic Publishing House, Bucharest, 1982;
- STAS 103-84- *Linii utilizate in desenul industrial*;
- STAS 1434-83- *Linii utilizate in desenul de constructii*
- SR ISO 7200:1994 *Indicatorul formatelor de desen tehnic*
- SR ISO 5457:1994 *Formatele de desen tehnic*

TOPOGRAPHY 2

Course Code: IG 1204

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Ioan IENCIU, PhD

Seminar tutor: Luciana OPREA, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Summer	Grade	5

COURSE AIMS:

The final objectives of the course for 1st semest refereas to the preparation of field activities, field recognition, measurement planning, measurements and the calculations. Progress in building surveying and geodetic instruments, positioning the emergence of modern technologies should be presented in the course, meeting the requirements of a modern higher education.

The specific objectives:

- knowledge of surveying equipment;
- making topographic measurements.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

Course contents:

1. thickening topographic triangulation networks - intersection before
2. Thickening topographic triangulation networks - intersection back
3. Networks topographic suspended
4. Networks complete topographic
5. Networks and acolytes topograficenodale
6. Study precision topographic networks
7. Raising details planimetric
8. Calculation surfaces
9. Detaching surfaces
10. leveling (terrestrial elevation)
11. Raising the elevation details
12. leveling traverses
13. The preparation of topographical plans
14. Drawing profiles

Laboratory contents:

1. Calculation Guidelines
2. Calculation sides and coordinates
3. The intersection before. solving trigonometric
4. The intersection before. solving analytical
5. Intersection back. solving trigonometric
6. Intersection back. Express Hansen
7. Intersection back. Express coordinates barycentre
8. Network topographical suspended
9. Complete Topographic Network
10. Topographic Nodal Network
11. Closure of planimetric details and calculation surfaces
12. Leveling geometric
13. The preparation of topographical plan and profiles
14. Supporting laboratory work

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

- C1. Designing and building networks for space geodetic topographical, cadastral and other engineering works
- C5. Determination of displacements and deformations of buildings and lands.

C6. Making cadastre information systems and specialized fields, and their use for real estate advertising works and the property valuation.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Exam at least 2 test subjects - oral / written examination and Partial test (60% of the final grade)

Test of the lab - practical (40% of the final grade)

RECOMMENDED READING:

- Deaconescu, C. - Topografie și desen tehnic, Editura Didactică Pedagogică, București, 1979;
- Dima, N. ș.a. - Topografie minieră, Editura Corvin, Deva, 1996;
- Dima, N. ș.a. – Topografie generală și elemente de topografie minieră, Editura Universitas, Petroșani, 2005;
- Leu, N. I. ș.a - Topografie și Cadastru Editura Universul, 2002;
- L. Oprea, I. Ienciu – Topografie I - îndrumător de laborator, Seria „Didactica”, Universitatea „1 Decembrie 1918”, Alba Iulia, 2009;
- L. Oprea – Topografie - îndrumător de proiect, Seria „Didactica”, Universitatea „1 Decembrie 1918”, Alba Iulia, 2009;
- Pădure, I.; Kovacs L. - Topografie Generală, Editura Risoprint, Cluj Napoca, 2005;
- Russu, A. - Topografie cu elemente de geodezie și fotogrammetrie, Editura Agrosilvică, București, 1968.

COMPUTER PROGRAMMING AND NUMERICAL METHODS

Course Code: **IG2101**

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Boca Maria Loredana, PhD

Seminar tutor: Boca Maria Loredana, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	Autumn	Grade	4

COURSE AIMS:

- Understanding IT tool and it's use in engineering applications.
- Training the ability to select a specific tool for a specific issue.

ENTRY REQUIREMENTS:

- Fundamental knowledge in computer operation.

COURSE CONTENTS:

The course covers the following main topics:

- Elementary issues for operating systems
- Using the Word editor for topography problems
- Using the Excel editor for topography problems
- Numerical methods for technical problems
- Using numerical program and graphic diagram for topography problems
- Using programming programs for solving engineering problems

TEACHING METHODS:

Lecture, conversation, exemplification, exercises.

LEARNING OUTCOMES:

- C4.1 Defining of basic concepts and principles of computer science and mathematical theories and models.
- C4.2 Interpretation of mathematical and informatics models (formal).
- C4.3 Identifying the adequate models and methods to solve real problems.
- C4.4 Using simulation to study the behavior patterns made and performance evaluation.

C4.5 Using of formal models in specific applications for various fields.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Projects/Assignments –60%; continuous assessment – 40%.

RECOMMENDED READING:

- B. Dèmidovitch et I. Maron, Èlèments de calcul numèrique, Èditions MIR, Moscou, 1973.
- Visual Basic 2005, Beginning, Thearon Willis, Bryan Newsome
- Matlab Programming, y. Kirani Singh, B. B. Chaudhuri
- <http://nptel.ac.in/courses/122106033/>

CIVIL, INDUSTRIAL AND AGRICULTURAL ENGINEERING ELEMENTS

Course Code: IG 2103

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Popa Dorin Victor, PhD

Seminar tutor: Popa Dorin Victor, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	Autumn	Grade	4

COURSE AIM:

The course presents a unified conception of the elements related to both the structural and the non-structural components of the building.

COURSE CONTENTS:

1. General formation and classification of constructions. Technical conditions
2. General formation of construction
3. Constructions classification
4. Buildings infrastructure
5. Waterproofing
6. Walls
7. Platforms
8. Stairs
9. Roofs
10. Finishing elements

TEACHING METHODS:

Lecture, conversation, exemplification;

LEARNING OUTCOMES

- Knowing and understanding the definition and classification of constructions, the general aspects of construction materials, technical conditions, structural frame (basements, foundations, walls, floors, stairs, roofs), waterproofing and finishing elements (plastering, painting, plating, platforms and woodwork)
- Knowing and understanding the particularly useful to students specializing in surveying - cadastre, long-term education and to specialists (engineers, sub-engineers, technicians) working in the construction field.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written test examination - 70%, Verification during the semester- 30%.

RECOMMENDED READING:

- Popa, D., - *Construcții Civile*, Didactica Series, Alba Iulia, 2004;
- Andreica, H. A., - *Construcții, Alcătuirea Și Calculul Elementelor De Construcție*, U.T. Pres Publishing House, Cluj Napoca, 2002
- Comșa, E., Moga, I., - *Construcții Civile*, Vol. II, U.T.C – N, 1992
- Proca, G., *Construcții*, Gh. Asachi University, Iași, 2007
- Stan, D., *Construcții si mediu*, Construction Technique University, Bucharest, 2007
- Mirel, F.D., *Construcții. Subansambluri constructive*, Construction Technique University, Bucharest, 2006;

TOPOGRAPHY PROJECT

Course Code: IG 2106

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Luciana OPREA, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	Autumn	Grade	2

COURSE AIMS:

The curriculum takes into account all necessary steps to achieve a topographical works endpoints of discipline referring to the actual preparation of a plan topographical and thematic plans in areas such as agriculture, construction, etc., which are always preceded documentation the surveying and geodetic, and finally the preparation of topographic maps or plans.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

1. Recognition of the land and site takeover
2. Identification of support network
3. Drawing up the outline, choice of route network and picketing lift
4. Measuring angles and distances in the network terrain
5. Calculation Guidelines, sides and coordinates provisional
6. Compensation planimetric network
7. Calculation of elevation network quotas points
8. Raising details planimetric and altimetry
9. Calculation of coordinates of the points of detail
10. Reporting points
11. The preparation of topographical plan
12. The preparation of topographical plan – inscriptions
13. Presentation of the project

TEACHING METHODS:

practical examples

LEARNING OUTCOMES:

- C1. Designing and building networks for space geodetic topographical, cadastral and other engineering works
C6. Making cadastre information systems and specialized fields, and their use for real estate advertising works and the property valuation.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Presentation of the project - practical (100% of the final grade)

RECOMMENDED READING:

- Deaconescu, C. - *Topografie și desen tehnic*, Editura Didactică Pedagogică, București, 1979;
- Dima, N. ș.a. - *Topografie minieră*, Editura Corvin, Deva, 1996;
- Dima, N. ș.a. - *Topografie generală și elemente de topografie minieră*, Editura Universitat, Petroșani, 2005;
- I. Ienciu, L. Oprea – *Topografie generală*, Seria „Didactica”, Universitatea „1 Decembrie 1918”, Alba Iulia, 2014;
- Ienciu, I.; Oprea, L.; Borșan, T. – *Caiet de practică – Măsurători terestre și cadastru – an I*, Seria Didactica, Universitatea „1 Decembrie 1918” Alba Iulia, 2008;
- Leu, N. I. ș.a - *Topografie și Cadastru* Editura Universul, 2002;
- Pădure, I.; Kovacs L. - *Topografie Generală*, Editura Risoprint, Cluj Napoca, 2005;
- Russu, A. - *Topografie cu elemente de geodezie și fotogrammetrie*, Editura Agrosilvică, București, 1968.

INFOGRAPHICS FOR TOPOGRAPHY AND CADASTRE

Course Code: IG 3103

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Ioan IENCIU, PhD

Seminar tutor: Luciana OPREA, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	4

COURSE AIMS:

- The general objective of discipline is the implementation of a routine regarding computer-aided graphics. In order, to cover all topics, we chose to work with complementary themes applied to deepen the topics treated in the course.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

- General concepts of graphical data processing;
- Raster and vector images;
- Surfer - software;
- Vextractor - software;
- AutoCAD - General remarks;
- AutoCAD - Creating and editing objects;
- AutoCAD - dimensioning objects;
- AutoCAD - the georeferencing of raster topographic plans;
- AutoCAD - „Topograph” application;
- AutoCAD - „TopoLT” application;
- AutoCAD - „SiroT” application;
- AutoCAD - drafting and plotting plans and maps.

Laboratory contents:

- Notion of Safety in laboratory;
- Vextractor – software: raster management, vectorization raster data, Export data;
- Surfer – software: Graphic Mode Achieving Work, 2D models, 3D models, exporting data;
- AutoCAD: Overview, settings, Import data, management work, creating layers objects, properties of objects, toolbars, drawing plans, georeferencing raster image, plotting works.
- AutoCAD - „Topograph” application; AutoCAD - „TopoLT” application; AutoCAD - „SiroT” application;
- Test of the lab.

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

C2. Making topographical required to develop specific plans and topographic and thematic maps.

C3. Closure technical networks - the utility angular measurements, distances, differences in level in the geodetic purposes and to reduce them to the reference surface.

C6. Making cadastre information systems and specialized fields, and their use for real estate advertising works and the property valuation.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Colloquy at least 2 test subjects - written examination (60% of the final grade)

Test of the lab - practical (40% of the final grade)

RECOMMENDED READING:

- Ienciu, I.; Oprea, L. - Prelucrarea automată a datelor analitice și grafice din topografie și cadastru, Editura Aeternitas, Alba-Iulia, 2009;
- Ienciu, I.; Oprea, L. – Infografică pentru topografie și cadastru, Seria Didactica, Universitatea „1 Decembrie 1918”, Alba-Iulia, 2009;

- Ienciu, I. - Exploatarea programelor topografice, Seria Didactica, Universitatea „1 Decembrie 1918”, Alba-Iulia, 2006;
- Ienciu, I. - Optimizarea rețelelor geodezice în cadastru, Editura Risoprint, Cluj-Napoca, 2006;
- Ienciu, I.; Rîșteiu, M.; Wainberg, D. - Suport informatic de digitizare a datelor din topografie și cadastru, Editura Aeternitas, Alba Iulia, 2003;
- *** - Manualul inginerului geodez, Volumul II, Editura tehnică București, 1985;
- *** - Manualul inginerului geodez, Volumul III, Editura tehnică București, 1985;
- *** - Surfer, Help;
- *** - Vextractor, Help;
- *** - AutoCAD, Help;
- Aplicația TopoLT, Help;
- *** - Aplicația Topograph, Help.

PHOTOGRAMMETRY 2

Course Code: IG 3105

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Dreghici Alexandra, PhD

Seminar tutor: Dreghici Alexandra, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	28	3	Autumn	Grade	3

COURSE AIMS:

- Using photogrammetric instruments and taking photogrammetric stereo couple images

ENTRY REQUIREMENTS:

Geometry, photogrammetry 1

COURSE CONTENTS:

- Introduction in Stereophotogrammetry
- Stereoscopic natural view
- Stereoscopic artificial view
- Stereoscopic model deformations
- Mathematical elements in stereophotogrammetry
- Stereocamera
- Taking stereo couple images
- Processing methods

TEACHING METHODS:

Lecture, conversation, exemplification, photogrammetric instruments and software

LEARNING OUTCOMES:

- Using photogrammetric techniques of taking stereo couple images
- Photogrammetric measurements

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – interpretative essay – 60%; continuous assessment – 40%.

RECOMMENDED READING:

- PALAMARIU M., DIMEN L., NOTIUNI DE FOTOGAMMETRIE TERESTRA, SERIA DIDACTICA UAB, 2002
- VOROVENCI, I., FOTOGAMMETRIE, ED. MATRIXROM BUCURESTI, 2010
- RUSU A., (1978) FOTOGAMMETRIE FORESTIERA, ED. CERES
- ZAVOIANU FL FOTOGAMMETRIE , ED. TEHNICA BUCURESTI, 1999
- TURDEANU L., FOTOGAMMETRIE ANALITICA , ED. ACADEMIEI BUCURESTI, 1999
- NICULESCU ST., (1987) FOTOGAMMETRIE, LITOGRAFIA UNIVERSITATII DIN PETROSANI
- FRITSCH D., (2005), PHOTOGRAMMETRIC WEEK '05, HERBERT WICHMANN VERLAG, HEIDELBERG
- FRITSCH D., (2007), PHOTOGRAMMETRIC WEEK '07, HERBERT WICHMANN VERLAG, HEIDELBERG

AUTOMATION OF THE TOPOGRAPHICAL AND GEODETIC SURVEYS

Course Code: IG 31071

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Luciana OPREA, PhD

Seminar tutor: George VOICU, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	4

COURSE AIMS:

The course objectives follow the knowledge progress in building surveying and geodetic instruments and learning methods of automated data acquisition and processing using worksheet.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

Course contents:

- Principles of topo-geodetic works;
- Automation of data collection;
- Laser distance meter. Automated drawing of surveying building;
- Total Station;
- Transferring data to and from the total station;
- GPS;
- Integrated system of GPS and total station;
- Processing data;
- Microsoft Excel – Overview;
- Working with formulas and functions library;
- Working with worksheets, transformation references with copy / move commands;
- Templates used in surveying: calculation guidelines, sides and coordinates, calculation of surface;
- Solving geodetic networks;
- Thickening geodetic networks.

Laboratory contents:

1. Notion of Safety in laboratory;
2. Total Station - overview;
3. Total Station – „surveying” programme;
4. Total Station – „setting out” programme;
5. Total Station – „freestation” programme;
6. Total Station – „area” programme, „tie distance” programme;
7. Total Station – „remote high” programme;
8. Total Station – create formats for downloading;
9. Total Station – downloading and uploading data from total station;
10. Microsoft Excel – calculation of guidelines, sides, coordinates and surfaces;
11. Microsoft Excel – Solving geodetic networks;
12. Microsoft Excel – Thickening geodetic networks;
13. Microsoft Excel – charts performance monitoring land and buildings;
14. Lab test.

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

- C2. Making topographical required to develop specific plans and topographic and thematic maps.
C3. Closure technical networks - the utility angular measurements, distances, differences in level in the geodetic purposes and to reduce them to the reference surface.
C5. Determination of displacements and deformations of buildings and lands.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Exam at least 2 test subjects - written examination (50% of the final grade)

Test of the lab - practical (50% of the final grade)

RECOMMENDED READING:

- Dima, N. – Geodezie, Editura Universitas, Petroșani, 2005;
- Ienciu, I.; Oprea, L. - Prelucrarea automată a datelor analitice și grafice din topografie și cadastru, Editura Aeternitas, Alba-Iulia, 2009;
- Ienciu, I. – Exploatarea programelor topografice, Seria Didactica, Universitatea „1 Decembrie 1918”, Alba-Iulia, 2006;
- Ienciu, I.; Oprea, L.; Voicu, G. E. – Automatizarea lucrărilor topo - geodezice, Seria Didactica, Universitatea „1 Decembrie 1918”, Alba-Iulia, 2008;
- Ienciu, I. – Optimizarea rețelelor geodezice în cadastru, Editura Risoprint, Cluj-Napoca, 2006;
- Ienciu, I.; Rîșteiu, M.; Weinberg, D. – Suport informatic de digitizare a datelor din topografie și cadastru, Editura Aeternitas, Alba Iulia, 2003;
- Tămăioagă, Gh.; Tămăioagă, D. – Automatizarea lucrărilor de cadastru, Editura Matrixrom, București, 2007;
- Vereș, I. – Automatizarea lucrărilor topo – geodezice, Editura Universitas, Petroșani, 2006;
- *** – Manualul de utilizare al stației totale Leica TCR 705;
- *** – Manualul de utilizare al Sistemului integrat stație totală și GPS;
- *** – Microsoft Excel, Manual de utilizare.*** .

ARCHAEOLOGICAL TOPOGRAPHY

Course Code: IG 31082

Type of course: elective

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Voicu George Emanuel, PhD

Seminar tutor: Voicu George Emanuel, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	4

COURSE AIMS:

- Knowledge of the subject, the scientific areas related to methods and techniques, classical and modern research in archeology.
- Familiarize students with the terrain prospecting methods and techniques in archaeological sites.

ENTRY REQUIREMENTS:

Introduction to archaeology; Auxiliary sciences of archeology.

COURSE CONTENTS:

- Archaeological topography - interdisciplinary science.
- Highlights protohistory.
- Archaeological culture.
- Traditional research methods and techniques in archeology.
- Modern methods and techniques of dating in archeology.
- Archaeological project management. The systematic and preventive research.
- Organizing archaeological sites. Management of archaeological excavation.
- Cabinet investigations in the approaches to the archaeological objectives.
- The field investigations in the approaches to the archaeological objectives.
- Management of topographic works in a ante excavation step.
- Topographic work management during excavation and / or post excavations. Impressive archaeological data collection.
- Evidence of the archaeological data from archaeological sites. Developing plans and thematic research reports.
- Synthesis features of morphology surrounding area. Extrasitu analysis through GIS.
- Spatial distribution analysis of the elements of archaeological interest. Intrasitu analysis through GIS.

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- understanding the successive stages and steps taken to an archaeological site;
- familiarity with the ways of completing the documentation site
- development of interest in archaeological topography.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – interpretative essay – 60%; continuous assessment – 40%.

RECOMMENDED READING:

- Al. Morintz, Chr. Schuster - *Aplicații ale topografiei și cartografiei în cercetarea arheologică*, Târgoviște, 2004.
- F. Stănescu - *Aplicațiile calculatoarelor electronice in arheologie*, Editura Ulise, Alba-Iulia, 2003.
- T. Borșan, G.E. Voicu – *Sisteme Informaționale Geografice – aplicații*, Seria Didactica, Alba Iulia, 2008.

ENGINEERING PHOTOGRAMMETRY

Course Code: IG3201

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Dreghici Alexandra, PhD

Seminar tutor: Dreghici Alexandra, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Summer	Grade	4

COURSE AIMS:

- Using photogrammetric instruments and taking photogrammetric images
- Photogrammetric measurements on the taken images, using certain instruments

ENTRY REQUIREMENTS:

Geodesy, photogrammetry

COURSE CONTENTS:

- Digital models in photogrammetry
- Taking terrestrial photogrammetric images
- Taking aerial photogrammetric images
- Photogrammetric images processing
- Digital photogrammetric stations
- Land 3D modeling
- Building 3D modeling

TEACHING METHODS:

Lecture, conversation, exemplification, photogrammetric instruments and software

LEARNING OUTCOMES:

- Using photogrammetric techniques in engineering field activities
- Designing 3D geodetic network for photogrammetric measurements and engineering activity

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – interpretative essay – 60%; continuous assessment – 40%.

RECOMMENDED READING:

- Ionescu, I., Fotogrammetrie inginerească, Editura MatrixRom, București, 2004
- Palamariu, M., Dimen, L., Noțiuni de fotogrammetrie terestră, Seria Didactica, Universitatea „1 Decembrie 1918” Alba Iulia, 2003
- Popa, A., Fotogrammetrie inginerească. Îndrumător de laborator, Seria Didactica, Universitatea „1 Decembrie 1918” Alba Iulia, 2009
- Chițea, Gh., Kiss, A., Vorovencii, I., Fotogrammetrie și teledetecție, Editura Universității „Transilvania” din Brașov, 2003
- Kiss, A., Fotogrammetrie forestieră, Editura Universității „Transilvania” din Brașov, 1992
- Kiss, A., Vorovencii, I., Fotogrammetrie, Editura Universității „Transilvania” din Brașov, 2000
- Rusu, A., Fotografia aeriană și teledetecția în economia forestieră, Editura Ceres, București, 1988
- Rusu, A., Fotogrammetrie forestieră, Editura Ceres, București, 1978

SPATIAL GEODESY

Course Code: IG 3202

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Tudor Borşan, PhD Eng

Seminar tutor: Tudor Borşan, PhD Eng

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	70	3 hour of lecture per week / 2 hour of seminar per week	Summer	Grade	5

COURSE AIMS:

- Knowing, understanding and a correct using of fundamental ideas concerning concepts specific to GNSS.

ENTRY REQUIREMENTS:

Geodesy; Topography; Signals used in Geodetic Measurements.

COURSE CONTENTS:

The course covers the following main topics:

- Introduction in spherical astronomy;
- Introduction to the GNSS. Background and history;
- Earth's atmosphere;
- Basic signal structure and error. GPS signal structure map;
- Positioning techniques;
- Data correction techniques and high resolution accuracy;
- Geodetic coordinate systems;
- Data collection techniques;
- Receiver structures;
- Receiver types;
- Accuracy and error terms;
- Areas of GPS applicability;
- The future of GPS in our country;
- Strategies for measuring and processing of GPS data.

The seminar covers the following main topics:

- GPS principles;
- Predictive modelling for GPS networks;
- GPS project planning;
- GPS Leica SR 510 presentation;
- Static surveys;
- Data post-processing;
- Rapid – static surveying. Wake up-sessions;
- Kinematic and Stop & Go surveying - using static initialization;
- Data post-processing - using Stop&Go surveying method;
- Computing transformation parameters between WGS84 and local coordinates;
- Using a Coordinate System with a Project;
- Creating a Format Template File. Uploading a Format Template File to the Sensor;
- GIS/CAD export;
- Laboratory testing.

TEACHING METHODS:

Conversation, exemplification.

LEARNING OUTCOMES:

- After completing the course, the students shall have knowledge about how satellites positions objects on and above surface of the Earth, as well as in space, knowledge of methods and techniques for determination of Earth size and shape and its deformation and change in time using positioning satellites;
- Knowledge of global positioning satellites applications in for example Construction and building industry, Transport systems, Navigation, and Oceanography.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

- A two-hour written examination (75% of the final grade)
- Carrying out practical work. (25% of the final grade)

RECOMMENDED READING:

- ACKROYD N., LORIMER R., Global navigation – a GPS user’s guide, Lloyd’s of London, 1990;
- DUMVILLE M., Autonomous Guidance and CONTROL of Construction Plant by GPS, Institut of Engineering Surveying and Space Geodesy, Nottingham, 1997
- FRENCH, G.T., - Understanding the GPS, GeoResearch Inc., 1996;
- HOFFMANN – WELLENHOF B., LICHTENEGGER H., COLLINS J., GPS – Theory and practice, third revised edition, Springer – Verlag Wien, 1994
- LEICA 2001- GPS Basic.

URBANISM

Course Code: IG 3205

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Popa Dorin Victor, PhD

Seminar tutor: Popa Dorin Victor, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	2	Summer	Grade	3

COURSE AIM:

Knowing the basics of the importance of urbanism;

COURSE CONTENTS:

1. General aspects of urbanism
2. Methodology for drawing up the urbanism documentation
3. Categories of urbanism documentation
4. The framework content of the general urban plan and the local urbanism rules for GUP
5. GUP foundation studies
6. The framework content of ZUP and the local legal regulation for ZUP
7. Structure of the ZUP framework
8. The content of the Detailed Urban Plan
9. DUP foundation studies

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES

- Developing the skills for achieving the urbanism documentation;
- Developing the skills and aptitudes for drawing up the studies for ZUP and GUP foundation
- Developing the skills and aptitudes for drawing up the studies for DUP foundation

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written test examination - 60%, Verification during the semester- 40%.

RECOMMENDED READING:

- Cornelia Bărbulescu, *Integrare tehnologică în arhitectura contemporană*, Presa Universitară Clujană Publishing House, Cluj-Napoca, 2002;
- Cantacuzino G. M., *Despre o estetică a reconstrucției*, Paideia Publishing House, Bucharest, 2001
- Iancu Adrian, *Elemente de arhitectură și urbanism*, U.T. Pre Publishing House”, Cluj-Napoca, 2002
- Niculescu Doina, *Elemente de urbanism*, Publishing House of the Polytechnic University of Timisoara, 2000;
- Popa Cristin Nicolae, *Rolul administrației publice în procesul de urbanizare*, Doctoral dissertation, Babeș-Bolyai University, Cluj-Napoca, 2002
- ****Legislatie privind urbanismul*, vol. I,II, MATRIX ROM Publishing House, Bucharest, 2008

MONITORING LAND AND CONSTRUCTION BEHAVIOUR

Course Code: IG 4102

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Dreghici Alexandra, PhD

Seminar tutor: Dreghici Alexandra, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	5

COURSE AIMS:

- Measuring methods for land and building monitoring
- Displacemet and deformation analysis

ENTRY REQUIREMENTS:

Geodesy, measurement adjustment

COURSE CONTENTS:

- Monitoring objectives, phases
- Displacement and deformation
- Factors that influence the deformation phenomena
- Displacement and deformation parameters
- Monitoring geodetic network
- Measuring methods for horizontal displacements
- Measuring methods for vertical displacements
- Deformation analysis

TEACHING METHODS:

Lecture, conversation, exemplification, field measurements, data processing.

LEARNING OUTCOMES:

- Field measurements in order to determine any land/building displacement or deformation
- Comparative analysis of monitoring systems, usinf repeated measurements. Results interpretation

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – interpretative essay – 60%; continuous assessment – 40%.

RECOMMENDED READING:

- Dragomir, V., Ghițău, D., Mihăilescu, M., Rotaru, M., (1977): Teoria Figurii Pământului, Editura Tehnică București
- Ghițău, D., (1983): Geodezie Și Gravimetrie Geodezică, Editura Didactică Și Pedagogică București
- Moldoveanu, C., (2002): Geodezie. Noțiuni De Geodezie Fizică Și Elipsoidală, Poziționare, Editura Matrix Rom București
- Neamțu, M., Onose, D., Neuner, J., (1988): Măsurarea Topografică A Deplasărilor Și Deformațiilor Construcțiilor, Institutul De Construcții București
- Nistor, Gh.: Geodezie Aplicată La Studiul Construcțiilor, Editura Gh. Asachi Iași
- Ortelecan, M., Pop, N., (2005): Metode Topografice De Urmărire A Comportării Construcțiilor Și Terenurilor Înconjurătoare, Editura Academicpres Cluj-Napoca
- Palamariu, M., Popa, A., (2008): Urmărirea Comportatii Terenurilor Si Constructiilor, Seria Didactica, Universitatea „1 Decembrie 1918” Alba Iulia
- Pelzer, H., (1985): Geodätische Netze In Landes- Und Ingenieurvermessung Ii, Konrad Wittwer Stuttgart

MINING TOPOGRAPHY

Course Code: IG 4103

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Ioan IENCIU, PhD

Seminar tutor: Andreea BEGOV-UNGUR, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	4

COURSE AIMS:

Complex technical activities at a mine, mining area or perimeter of operation requires in most cases the presence of topographic representation. For troubleshooting skills required mining topography surveying, geodesy and specific knowledge mining. Training course offers students the opportunity to activate an updated mining or underground.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

- General terms of mining activities;
- Topographical work at mine surfaces;
- Marking and Signalling points from underground;
- Junctions;
- The projection of reference system from surface to underground;
- Junction of design work with topographical network from underground;
- The planimetric system from underground;
- Level project at the mine surface;
- Underground levelling;
- Surveying the underground details. Reception and evidence of mining works. Reception and evidence of underground production;
- Mining problems;
- Surveying work for surface mining;
- Development of topographic plans and stock assessment

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

C4. Land application projects of urban and spatial planning, civil engineering, transport networks and artwork, hydraulic engineering and land reclamation etc.

C5. Determination of displacements and deformations of buildings and lands

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Colloquy at least 2 test subjects - written examination (60% of the final grade)

Test of the lab - practical (40% of the final grade)

RECOMMENDED READING:

- Dima, N. ș.a. – Topografie generală și elemente de topografie minieră, Editura Universitas, Petroșani, 2005;
- Leu, I. N., ș.a. - Topografie și cadastru, Editura Universul, București, 2002;
- Neamțu, M.; Ulea, E., ș.a. - Instrumente topografice și geodezice, Editura Tehnică, București, 1982;
- Ortelecan, M.; ș.a. - Trasarea lucrărilor miniere, Editura "Infomin", Deva, 1999;
- Pădure, I. - Topografie minieră, lucrări practice, Editura Risoprint, Cluj-Napoca, 2005;
- Pădure, I. - Topografie minieră, Editura Corvin, Deva, 1996.

CADASTRE 2 PROJECT

Course Code: IG 4105

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Luciana OPREA, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	28	2	Autumn	Grade	2

COURSE AIMS:

Curriculum intends to present the relevant legislation on how to prepare cadastral documentation, and finally drawing up a practical thematic project and public presentation of them.

ENTRY REQUIREMENTS: -**COURSE CONTENTS:**

1. Land Legislation
2. Order no. 700/2014 regarding the content and the documentation topographic
3. Documentation of land located in extravilan Property register
4. Documentation tabulation of land located in town
5. Documentation tabulation of lands with forest
6. Documentation detachment a building land
7. Documentation for a real estate land and construction detachment
8. Documentation for a real estate joining
9. Documentation for registering a definitive construction in the land
10. File external verification of topographic works
11. Presentation of the project

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

C4. Land application projects of urban and spatial planning, civil engineering, transport networks and artwork, hydraulic engineering and land reclamation etc.

C6. Making cadastre information systems and specialized fields, and their use for real estate advertising works and the property valuation.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Presentation of the project - practical (100% of the final grade)

RECOMMENDED READING:

- *Leu, I.N. ș.a. - Topografie și Cadastru, Editura Universul, București, 2000;*
- *Mihăilă, M., ș.a. - Cadastru general și publicitatea imobiliară, Editura Ceres, București, 1995;*
- *Olaru, Gh., ș.a. - Cadastru funciar, Editura Ceres, București, 1978;*
- *Oprea, L. - Cadastru – Îndrumător de proiect și practică cadastrală, Editura Aeternitas, Alba Iulia, 2009;*
- *Oprea, L. - Cadastru – Îndrumător de proiect, Seria Didactica, Universitatea „1 Decembrie 1918” Alba Iulia, 2008;*
- *Pădure, I. - Cadastru funciar, Editura Risoprint, Cluj-Napoca, 2006;*
- *Pădure, I., Tudorașcu, M., Oprea, L. - Cadastru funciar, Seria Didactica, Universitatea „1 Decembrie 1918” Alba Iulia, 2005;*
- *Pădure, I., Tudorașcu, M., Oprea, L. - Cadastru funciar: in memoriam, Editura Risoprint, Cluj-Napoca, 2009;*
- *Ordin nr. 700/2014*

ENGINEERING TOPOGRAPHY 1

Course Code: IG 41062

Type of course: Compulsory - elective

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Ioan IENCIU, PhD

Seminar tutor: George VOICU, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	5

COURSE AIMS:

• The final objectives of the course covers the activities of the office preparing for the calculation of trace elements or coordinates, recognizing land tracings planning, execution tracing and mapping a network characteristic elements. Progress in building surveying and geodetic instruments, positioning the emergence of modern technologies help achieve the objectives, to the demands of modern higher education.

ENTRY REQUIREMENTS: -

COURSE CONTENTS:

Course contents:

1. Object of discipline;
2. Planimetric and altimetric setting out network;
3. Setting out of angles;
4. Setting out of distances;
5. Setting out the level points and slope lines;
6. Setting out the constructions – generalities;
7. Methods of setting out the constructions;
8. Setting out terrestrial communication ways– generalities;
9. Methods of setting out the terrestrial communication ways;
10. Accuracy in setting out the terrestrial communication ways;
11. Connection of communication – calculus of setting out elements;
12. Connection of communication - application projects;
13. Specific problems of engineering topography .

Laboratory contents:

1. Getting the topography safety
2. Draw horizontal angle – methods
3. Plotting distances field roulette – methods
4. Draw distances in the field with theodolite – methods
5. Setting out in the field with the total station by polar method
6. Setting out the land with total station in coordinated
7. Drawing shares with classical instruments
8. Drawing quotas with electronic instruments
9. Plotting platforms
10. construction stakeout - Location Highlights
11. construction stakeout - specific elements of construction
12. Drawing paths of communication
13. Drawing waterworks
14. Verification Test

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

C3. Closure technical networks - the utility angular measurements, distances, differences in level in the geodetic purposes and to reduce them to the reference surface.

C4. Land application projects of urban and spatial planning, civil engineering, transport networks and artwork, hydraulic engineering and land reclamation etc.

C5. Determination of displacements and deformations of buildings and lands.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Exam at least 2 test subjects - written examination (60% of the final grade)

Test of the lab - practical (40% of the final grade)

RECOMMENDED READING:

- Coșarcă, C. - Topografie inginerească, Editura Matrixrom, București, 2003;
- Dima, N. ș.a. – Topografie generală și elemente de topografie minieră, Editura Universitas, Petroșani, 2005;
- Ienciu, I.; Oprea, L.; Borșan, T. – Caiet de practică – Măsurători terestre și cadastru – an I, Seria Didactica, Universitatea „1 Decembrie 1918” Alba Iulia, 2008;
- Leu, N. I. ș.a - Topografie și Cadastru Editura Universul, 2002;
- Pădure, I.; Kovacs L. - Topografie Generală, Editura Risoprint, Cluj Napoca, 2005.

GEOGRAPHIC INFORMATION SYSTEMS

Course Code: IG 41072

Type of course: optional

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Tudor Borşan, PhD Eng

Seminar tutor: Tudor Borşan, PhD Eng

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	2 hour of lecture per week / 2 hour of seminar per week	Autumn	Grade	5

COURSE AIMS:

- Knowing, understanding and a correct using of fundamental ideas concerning concepts specific to GIS.

ENTRY REQUIREMENTS: Cartography; Geomorphology; CAD techniques.

COURSE CONTENTS:

The course covers the following main topics:

- Introduction and theoretical issues in GIS;
- Areas of GIS applicability;
- GIS components;
- GIS functions;
- Spatial data structures. Internal representation of vector layers. Internal encoding of a raster;
- Databases;
- Spatial data acquisition;
- Data conversions. Data import. Import from other GIS software. Import from CAD software;
- Data structures. Designing a database for attribute data;
- Acquiring and integrating data;
- Attribute and spatial queries;
- Building surface models;
- Exploratory data analysis;
- Maps and digital cartography. Thematic mapping techniques.

The seminar covers the following main topics:

- Preparation of a GIS project;
- GIS products;
- Arc Gis Desktop's modules;
- Conversion of analog cartographic products;
- Building new shapefile;
- Building new geodatabase;
- Map rectification, georeferencing and digitizing;
- The digitizing process. Digitizing regimes;
- Using symbols and creating annotations in GIS;
- Integrating and manipulating attribute data;
- Attribute and spatial queries;
- Building surface models;
- Spatial analysis;
- Thematic mapping techniques.

TEACHING METHODS:

Conversation, exemplification.

LEARNING OUTCOMES:

- Using GIS enhances students' ability to think critically about analyzing data.
- Using GIS promotes students' ability to use numbers and numeric skills, and to use tools that facilitate processing and transferring information.;
- This technology enables students to visualize spatial patterns, linkages, and relationships. GIS is used not only in geography courses, but in environmental studies, earth science, history, mathematics, chemistry, biology, language arts, and other subjects.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

- A two-hour written examination (75% of the final grade)
- Carrying out practical work. (25% of the final grade)

RECOMMENDED READING:

- GIS by ESRI – Michael Minami, Using Arc Map, Environmental Systems Research Institute, Inc., 380 New York Street, Redlands, CA 92373-8100, USA;
- GIS by ESRI – ***, Editing in Arc Map, Environmental Systems Research Institute, Inc., 380 New York Street, Redlands, CA 92373-8100, USA;
- GIS by ESRI – Aleta Vienneau, Using Arc Catalog, Environmental Systems Research Institute, Inc., 380 New York Street, Redlands, CA 92373-8100, USA;
- Wheatley, D., Gillings, M., Spatial Technology and Archaeology – The Archaeological Applications of GIS, 2002.

DESIGN AND OPTIMIZATION OF GEODETIC NETWORKS

Course Code: IG 4201

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Begov Ungur Andreea, PhD Eng.

Seminar tutor: Begov Ungur Andreea, Lecturer PhD Eng.

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	48	4	Summer	Exam	4

COURSE AIMS:

- knowing, understanding and a correct using of fundamental ideas concerning concepts specific to design and optimization of geodetic networks;
- knowing how to design a geodetic network;
- knowing the categories and criteria of optimization and applying them in the design of geodetic networks.

ENTRY REQUIREMENTS:

Statistics and measurements compensation, Geodesy, Satellite geodesy

COURSE CONTENTS:

1. Generalities.
2. Geodetic network design. Principles for develop the geodetic networks.

The component parts of geodetic network project.

3. Methods to design geodetic networks.
4. The materialisation of geodetic networks on the field.
5. Optimization generalities. The matrix form of linear programming problem.

The problem of subdimensionate linear systems.

The problem of supradimensionate linear systems.

6. Scope functions and restrictions to geodetic network optimization.
7. Local precision indicators. Global precision indicators. Economic indicators.
8. Categories and criteria of optimization. Classification of optimization criteria.
9. Optimizing the initial data.
10. Optimizing the configuration of geodetic networks.
11. Optimizing the measurements related to the geodetic networks.
12. Examples of optimal elements in geodetic networks

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- to accustom students with terminology, methods, equipment and instruments specific of this discipline;
- to give students the basics concepts needed to design and optimization of a geodetic networks;
- understanding of issues they will encounter in their future profession.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written exam – 60%; Portfolio of practical work – 40%.

RECOMMENDED READING:

- Bălăcescu O.- Optimizarea bazelor geodezice și topografice utilizate în exploatările miniere la zi, Teză de doctorat, Petroșani, 2004;
- Fotescu N.- Contribuții privind optimizarea construcției rețelelor geodezice, Teză de doctorat, ICB, 1979;
- Ghițău D.- Geodezie și gravimetrie geodezică, Ed. Didactică și pedagogică, București, 1983;
- Ienciu, I. – Optimizarea rețelelor geodezice în cadastru, Editura Risoprint, Cluj-Napoca, 2006;
- Moldoveanu, C. - Geodezie. Noțiuni de geodezie fizică și elipsoidală, poziționare, Editura Matrix Rom, București, 2002;
- Palamariu, M. -Geodezie, Editura RISOPRINT, Cluj Napoca, 2006;
- Palamariu, M. - Cartografie și Geodezie (Aplicații), Editura RISOPRINT, Cluj Napoca, 2004;
- *** - Manualul inginerului geodez;
- *** - Instrucțiuni pentru realizarea rețelelor geodezice ale localităților, București, 1983.

SPATIAL PLANNING AND URBANISM

Course Code: IG 4203

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Popa Dorin Victor, PhD

Seminar tutor: Popa Dorin Victor, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	48	4	Summer	Grade	3

COURSE AIM:

Developing the capacity for knowing and understanding the importance of spatial planning

COURSE CONTENTS:

1. General considerations;
2. Background elements;
3. Drawing up the technical documentation (studies, plans) for national, county, municipal spatial planning;
4. Characteristics of rural spatial planning;
5. Categories of spatial planning documentation;
6. SP documentation elaboration procedure;
7. The procedure of acquiring the spatial planning documentation;
8. Principles and procedures for updating the spatial planning documentation;
9. Population's involvement in drawing up the spatial planning documentation
10. Relationship with the urbanism documentation
11. Content of the spatial planning documentation

TEACHING METHODS:

Lecture, conversation, exemplification;

LEARNING OUTCOMES

- The ability to understand and apply the Romanian current legal framework and the alignment to the EU principles and directions;
- Developing the skills and aptitudes for drawing up the spatial planning documentation;
- Developing the skills to achieve relationships with the spatial planning documentation;

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written test examination - 60%, Verification during the semester- 40%.

RECOMMENDED READING:

- Bold, I., *Organizarea teritoriului*. Mirton Publishing House, Bucharest, 1999
- Minciu, R., - *Amenajarea turistică a teritoriului* – Sylvi Publishing House, Bucharest, 1995.
- Mitache St., Manole V., Bran, F., Stoian, M, Istrate I. - *Agroturism si turism rural* - Fax-Press Publishing House, Bucharest, 1996.
- Popa Cristin Nicolae, *Rolul administrației publice în procesul de urbanizare*, Doctoral dissertation, “Babeș-Bolyai” University, Cluj-Napoca, 2002
- ****Legislație privind urbanismul si amenajarea teritoriului*, vol I,II, MATRIX ROM Publishing House, Bucharest, 2008
- Popa D -*Amenajarea Teritoriului si Urbanismul*,Ed. Risoprint,Cluj Napoca,2010

METHODS AND TECHNIQUES OF PROJECT PRESENTATION

Course Code: IG 4204

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Voicu George Emanuel, PhD

Seminar tutor: Voicu George Emanuel, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	24	2	Summer	Grade	2

COURSE AIMS:

- Familiarity with the methods of presentation of a project;
- Editing and archiving of documents related to a presentation;
- Use of databases;
- Troubleshooting form of presentation;

ENTRY REQUIREMENTS:

Efficient allocation of communication and networking techniques at the organizational level or professional group assuming specific roles under different hierarchical levels.

COURSE CONTENTS:

- Elements editing documents;
- Archiving techniques;
- Solving problems methodology;
- Team Activity ;
- Use of network resources;
- Making presentation objectives;
- Text edit;
- Using the database;
- Conditions teamwork;
- Planning and making the presentation;
- Animation ,time publication on Internet;
- Presentation of the project;

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- Planning, execution and publication on the Internet of the presentation of the project;
- Acquiring the qualities of teamwork.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – 50%; continuous assessment – 50%.

RECOMMENDED READING:

- Mihaela Brut, // *Instrumente pentru elearning. Ghidul informatic al profesorului modern*//, Polirom, Iași, 2006, cap. 4, „Crearea de tutoriale utilizând Microsoft PowerPoint”.
- Bogdan Pătruț, Monica Pătruț, // *Aplicatii PowerPoint educationale*//, EduSoft, Bacău, 2005, cap. 1, „Utilizarea programului PowerPoint”.
- Negrino, Tom, // *Cum sa realizam o prezentare in PowerPoint - ghid rapid de proiecte prin imagini*//, Editura Corint, Bucuresti, 2005.
- Gilgen, Read, // *Office PowerPoint 2003 pentru incepatori*// Bucuresti, ALL, 2004.

GEOINFORMATICS

Course Code: IG 42091

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Luciana OPREA, PhD

Seminar tutor: George Voicu, PhD

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	48	6	I	Grade	4

COURSE AIMS:

Curriculum is considering implementation of a routine regarding the use of software modules E-Terra developed by A.N.C.P.I., given the dynamics of geodesy laws. To cover all topics, it has opted to work with complementary themes applied to deepen the topics covered in the course.

ENTRY REQUIREMENTS:**COURSE CONTENTS:**

Course contents:

1. Introduction to geoinformatics. Evidence of topographical fund;
2. Systems for topographical and cadastral registration of the fund in an international context;
3. Organization of cadastral activity in Romania;
4. Legislation land;
5. Legal systems of the property evidence in Romania;
6. Take cadastral works;
7. The organization of cadastre and land registry;
8. Techniques of data storage in databases;
9. Establishment of the cadastre database - The "Body property";
10. E-Terra program;
11. The computer system of managing land registers;
12. Ways of carrying out surveying work.

Laboratory contents:

1. E-Terra Program - the first real estate registration
2. E-Terra Program - dismemberment
3. E-Terra Program - joining
4. E-Terra Program - real estate data update
5. E-Terra Program - apartment
6. E-Terra Program - reartamnt
7. E-Terra Program - grinding abroad
8. Supporting laboratory work

TEACHING METHODS:

Instruction is a combination of lectures, conversation and theoretical and practical examples

LEARNING OUTCOMES:

- C1. Designing and building networks for space geodetic topographical, cadastral and other engineering works
- C3. Closure technical networks - the utility angular measurements, distances, differences in level in the geodetic purposes and to reduce them to the reference surface.
- C6. Making cadastre information systems and specialized fields, and their use for real estate advertising works and the property valuation.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Exam at least 2 test subjects - oral / written examination and Partial test (50% of the final grade)

Test of the lab - practical (50% of the final grade)

RECOMMENDED READING:

- *Drăgoi, A. - Elemente de drept civil, drept funciar și publicitate imobiliară, Editura Aeternitas, Alba Iulia, 2004;*
- *Ienciu, I. - Exploatarea programelor topografice, Seria Didactica, Universitatea „1 Decembrie 1918”, Alba-Iulia, 2006;*

- Ienciu, I. – *Optimizarea rețelelor geodezice în cadastru*, Editura Risoprint, Cluj-Napoca, 2006;
- Pădure, I., Tudorașcu, M.; Oprea, L. – *Cadastru funciar, Seria Didactica, Universitatea „1 Decembrie 1918”, Alba-Iulia, 2005;*
- A.N.C.P.I. – *e-Terra – suport tehnic;*
- A.N.C.P.I. – „*Fisa corpului de proprietate*” – suport tehnic;
- A.N.C.P.I. – *SIGCF – suport ethnic.*