

Transilvania University of Braşov, Romania

Study program: Geomatic Engineering

Faculty: Silviculture and Forest Engineering

Study period: 4 years (bachelor)

1st Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mathematical Analysis	AMAT	3	2	1	-	-

Course description (Syllabus): the discipline covers the following: Sequences of Real Numbers (Convergent sequences; Cauchy sequences; Cauchy's convergence criterion for sequences of real numbers; Convergence criterions); Numerical Series (Convergence; Operations with numerical series; Series of positive terms; Series of arbitrary terms); Sequences and Series of Functions; Sequences of functions; Series of functions; Power Series (Power series; Taylor series). Applications in approximate calculus; Differential Calculus (One variable functions; Functions of several variables; Limits of functions; Continuous functions; Derivatives Partial derivatives; Differentials; Taylor polynomial; Local extreme of functions); Applications; Integral Calculus (Antiderivatives; Integration of rational function, integrals of certain irrational functions, integral involving trigonometric functions; Definite integrals; Practical problems which lead to definite integral); Applications; Line integral of the first kind and of the second kind; Conditions for independence of integration path; Applications.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Linear Algebra, Analytical and Differential Geometry	ALGAD	4	2	2	-	-

Course description (Syllabus): the discipline covers the following: Functions, relations and binary operations; Finite algebraical structures; Matrix analysis; Linear algebra; Linear systems; Free vectorial space; Plan and the right in space; Translations and rotations; Changes landmarks in plane and in space; Conical; Sphere; Generating surfaces; Plane curves; Curves in space; Geometry of surfaces.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Descriptive Geometry	GD	4	2	-	2	-

Course description (Syllabus): This course introduces fundamental principles in developing graphical solutions to engineering problems using descriptive geometry. Topics covered in this course include: Basic concepts - projection planes, parallel projection, orthographic projection, three orthogonal views; Point in the 3-D coordinate system; Straight lines - points view of a line, types of lines, relationships of lines; Plane - types of planes, edge view of a plane, lines in a plane; Methods of descriptive geometry; Surface of revolution; Plane sections. Learning objective: students will be able to analyze and solve basic problems involving graphics and spatial manipulations for engineering applications.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Physics	FIZ	4	2	-	1	-

Course description (Syllabus): the discipline covers the basics of the Applied Physics: Basic measurement units; Mechanics (short history and basic concepts). Kinematics (dynamics of the material points, principles and laws of

mechanics); Kinematics and dynamics of point systems; Fluid Mechanics (properties of fluids, fluid statics, fluid dynamics); Thermodynamics (basic notions, principles, gases); Optics (general principles, systems, lens, light inference, light polarization). Laboratory consists of practical applications on the main topics covered by course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Equipment and Methods Used in Land Surveying	IGMM	5	2	-	2	-

Course description (Syllabus): the discipline covers the following: Introduction to land surveying; Errors in land surveying; Equipment and instruments used in land surveying; Remote distance measurement; Levelling; Global Positioning System. Laboratory includes practical applications on the description and presentation of instruments and equipment, measurement methods, maps, map features and determination, calculation and design of features using maps.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Engineering Drawing and Computer Aided Design	DTI	5	2	-	2	-

Course description (Syllabus): the discipline covers the following: Introduction to engineering drawing and CAD; Scope and objectives of engineering drawing and CAD; Standards and norms in engineering drawing; Drawing and representation in orthogonal projection; Drawing and dimensioning in general; Introduction to CAD systems and AutoCAD; Drawing in AutoCAD; Object editing in AutoCAD; Object viewing and printing; Working with text in AutoCAD; Dimensioning in AutoCAD; Hatching in AutoCAD. Practical activities consist of using AutoCAD to build drawings specific to geomatic engineering and of learning the basic concepts and commands to work with AutoCAD in this field of engineering.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Chemistry	CHIM	2	1	-	1	-

Course description (Syllabus): the discipline covers the following: Fundamental concepts of chemistry; Matter structure; Laws of chemistry; Atom structure; Chemical elements; Physio-chemical bounds; Chemical compounds; Chemical transformations; Water; Molecular systems; Chemical equilibrium; Acids; Bases; pH. Laboratory covers practical applications on the subjects learned at the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Academic Writing	SA	1	1	-	-	-

Course description (Syllabus): the discipline covers the following: Structure and contents of academic papers; Literature review; Using and citing sources of ideas; Plagiarism; Academic writing; Oral presentations.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Numerical Methods	MN	3	2	2	-	-

Course description (Syllabus): the discipline covers the following: Systems of algebraic linear equations; Vectors; Nonlinear equations; Polynomial interpolation and approximation; Numerical differentials; Numerical integrals. Laboratory consists of discussions and exercises on the topics covered by course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Applied Mathematics	MATS	2	1	1	-	-

Course description (Syllabus): the discipline covers the following: Differential equations; Cauchy problem; Lagrange equations; Equations with constant coefficients; Euler Equations; Systems of linear differential equations; Introduction to field theory; Gradients of scalar fields; Divergence and rotor of a vector field; Hamilton's operator; Fourier series; Trigonometric series; Series of orthogonal functions; Random variables; Operations with random variables; Averages; Dispersion. Practical applications consist of examples worked for each topic covered by the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Building Engineering	CGC	4	2	-	2	-

Course description (Syllabus): the discipline covers the following: Introduction; Classification of buildings; Description and specification of building materials (wood, mineral binders, concrete, stone); Building components; Calculus of buildings and their components (roofs, floors, walls, foundations); Dimensions and tolerances; Technical prescriptions and recommendations for design; Roofs; Build-up elements; Walls; Foundations; Different types of buildings: civil buildings, industrial buildings, engineering constructions. Laboratory consists of calculation, dimensioning and mechanical verification on different building components.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Topography I	TOP01	5	2	-	2	-

Course description (Syllabus): the discipline covers the following: Principles of land surveying; Methods used in land surveying; Field planning; Design of land surveying networks; Types of measurements and methods used; Error handling, accuracy and precision. Laboratory covers a practical application as specific to topography and land surveying.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Basics of Mathematical Physics	EFM	2	1	-	1	-

Course description (Syllabus): the discipline covers the following: Elliptic partial differential equations (Cauchy-Riemann system of partial differential equations); Structural properties of the solutions for hyperbolic and parabolic partial differential equations (problems of the theory of wave equation and heat conduction equation); Theory of linear integral equations; Basic practical methods for the solution of partial differential equation. The practical applications consist of discussions, solutions and case studies on the topics included in the course.

Course title	Code	No. of credits	Number of hours per week			
			Course	Seminar	Laboratory	Project
Astronomical Geodesy	AG	4	2	-	2	-

Course description (Syllabus): the discipline covers the following: Introduction into astronomical geodesy; Point location on the sky; Celestial coordinates; Solar movement; Introduction to spherical trigonometry; Coordinate systems; Coordinate transformation; Determination of azimuth and terrestrial coordinates; Earth shape; Astro-mechanics; Orbital physics. Laboratory consists of a field trip to an astronomic observatory and practical exercises on the topics covered at course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Probability Theory and Mathematical Statistics	TPSM	2	2	-	2	-

Course description (Syllabus): the discipline covers the following: Descriptive statistics; Data visualizations; Theoretical distributions and data fitting; Correlation analysis; Regression analysis; Testing of significance; Analysis of variance. Laboratory consists of practical applications on the main topics covered by the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practical training I - Topography	PRDOM1	4	-	-	-	60 hours

Course description (Syllabus): the discipline consists of applying the knowledge and developing practical skills by a practical (field) application specific to land surveying followed by the development of maps and sections.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Management	MAN	2	1	1	-	-

Course description (Syllabus): the discipline covers the following: Basic concepts of management as a science and practice; Functions of management; Types of management; Modern management methods; Strategic management; Mission and market segment; Management of change; Adaptive management; Organizational culture; Decision methods; Negotiation; Organizational responsibilities; Social responsibilities; Management of conflict; Evaluation and control of the management activity. Methods for assessing the quality of the management; Business plans. Laboratory consists of a series of cases studies on the topics covered at course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LE01	2	1	1	-	-

Course description (Syllabus): the discipline covers the following: English tenses: forms and meanings; English aspects: forms and meanings, temporal-aspectual combinations in the affirmative, interrogative, and negative; English spelling rules; Passive voice; Reported speech; Conditional clauses; Revision. The seminar activities consist of interactive discussions on the topics covered in the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LE02	2	1	1	-	-

Course description (Syllabus): the discipline covers the following: The noun; The article; The Genitive; The adjective; The preposition; Relative pronouns; Revision. The seminar activities consist of interactive discussions on the topics covered in the course.

2nd Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Introduction to Computer Science	PCLP1	4	2	-	2	-

Course description (Syllabus): the discipline covers the following: Computer architecture; Interfaces and peripheral devices; Numerical systems; Information systems; Data types and information representation in computers; Algorithms and logical workflows; Operation systems; File systems; Computer networks; Office suite. Laboratory consists of practical applications developed in Microsoft Excel as well as practical applications specific to geomatic engineering.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Ellipsoidal Geodesy	GE	5	2	-	2	-

Course description (Syllabus): topics covered in this course include: Curves on the surface of rotation ellipsoid. Geodetic problems on the surface of rotation ellipsoid.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Measurement Adjustment and Mathematical Statistics I	CMSM1	5	2	-	2	-

Course description (Syllabus): the discipline covers the following: Statistical indicators; Distributions; Least squares principle; The stochastic processing of geodetic measurements; Processing of direct measurements; Methods of calculation; Adjustment of direct measurements; Processing of indirect measurements; Mathematical formulation of adjustments; Systems of normal equations; Accuracy estimation in adjustments; Adjustment of a geometric network. Laboratory consists of practical applications on the topics presented in the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Topography II	TOPO2	5	2	-	2	-

Course description (Syllabus): the discipline covers the following: Geodetic networks; Geodetic measurement; Design and calculus of geodetic networks; Types of geodetic networks; Local geodetic networks; Coordinate transformation and calculation; Parcels and property delimitation. Laboratory consists of practical applications on some of the topics covered in the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Topography project	PRTPO2	2	2	-	-	2

Course description (Syllabus): the discipline consists of using the knowledge, tools and methods to design a land surveying network.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Remote Measurement by Waves	MGUN	4	2	-	2	-

Course description (Syllabus): the discipline covers the following topics: Introduction to remote measurement; Fields of application; Waves and oscillations; Refraction; Trajectories in distance measurement; Methods of measurement by waves. Laboratory consists of practical applications on the topics presented at course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer Programming and Programming Languages	PCLP2	4	2	-	2	-

Course description (Syllabus): the discipline covers the following: Introduction and recapitulation on algorithms; Programming in Turbo Pascal; Programming in C++; Programming in Scilab; Programming in Mathcad; Programming in Excel; Programming of databases. Laboratory includes practical applications on programming in different environments.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Measurement Adjustment and Mathematical Statistics II	CMSM2	4	2	-	2	-

Course description (Syllabus): the discipline includes the following: Estimation of indirect measurement accuracy; Ellipse errors; Adjustment of geodetic networks; Preliminary data processing; Variations of distance and angles; Particular adjustment equations; Situations of equivalence (Schreiber); Multiple intersection; Combined intersection and retro-intersection; Adjustment of conditional measurements; Estimation of precision; Adjustment of geodetic triangulation networks; Adjustment of planimetric traverses.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geodetic Gravimetry	GG	4	2	-	1	-

Course description (Syllabus): topics covered in this course include: Gravifitic field; Equipotential surfaces; Gravity field anomalies. Systems of altitudes. Geoid undulations. Vertical deviations. Laboratory consists of practical applications of some topics covered in the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geodesy	GEO	5	2	-	1	2

Course description (Syllabus): The objective of the course is to provide knowledge of the elements of potential theory, its development in spherical and rectangular series. From these theories the form and dimensions of the Earth are deduced, in the most general aspect. We study the equipotential surfaces, the altitude systems most used in geodesy, in general, and in our country in particular. The discipline determines the necessary elements in the exposition of the Projection Systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer-Aided Graphics	GAC	3	2	-	2	-

Course description (Syllabus): Knowing the workflow of the program AutoCAD. Learning the ways of using the commands by accessing the menus, the utilities buttons or by using the command line.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geodetic Data Processing	TPMG	2	1	-	1	-

Course description (Syllabus): the discipline includes the following: Measurement of physical quantities; Definitions; Errors; Classical and modern techniques of measurement; The use of total stations; Using GNSS technology; Processing of the data collected in the field; Accuracy estimation; Presenting data from measurements; The legal framework; Writing technical documentation; Data archiving. Laboratory includes some examples, case studies and practical application of the concepts and methods presented in the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practical training II	PRDOM2	4	-	-	-	60 hours

Course description (Syllabus): the discipline covers the following: Field recognition of geodetic landmarks; Development of description field-book of geodetic landmarks; Development of documentation on the geodetic landmarks; Application of the complex series method; Applications of geodetic trigonometric levelling techniques; Application of precision geodetic levelling techniques.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Environment Protection	PM	3	2	-	1	-

Course description (Syllabus): the discipline covers the following: Introduction to environment protection; Objectives of the natural environment protection; Characteristics of natural and human-built environments; Threats and pressures on the environment; Types of protected areas, nature monuments and their conservation aims; Nature monuments; Management plans and delimitation of protected areas; Methods to assess the conservation status; Environmental impact assessment; Nature conservation in Romania. Laboratory consists of practical applications on the topics covered in the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Geography	GF	2	2	-	1	-

Course description (Syllabus): the discipline covers the following: Earth structure; Mineralogical and petrographic composition of the Earth crust; Terrestrial relief genesis; Pedogenesis processes; Soil as a system; Physical, physic-mechanical, chemical, hydro-physical, thermal and aeration properties of soils; Soils classification in Romania; Description of the Romanian soils. Laboratory consists of practical applications on the topics covered in the course.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LE03	2	1	1	-	-

Course description (Syllabus): the discipline covers the following: The internet (the basics, Internet browsers, Search Engines, Things on the net, Internet terms, E commerce, Internet Security, Email, Email comprehension 1, Email comprehension 2, Useful verbs, Revision wordsearch, Your software, Your internet). The course is complemented by interactive discussions in English.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language	LE04	2	1	1	-	-

Course description (Syllabus): The course aims to improve the students` ability to understand and reproduce relevant linguistic structures; the ability to express themselves effectively in writing and in speech, the ability to apply creatively the knowledge acquired in college in different professional situations (the use of specialized terminology).

3rd Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cartography	CART	4	2	-	2	-

Course description (Syllabus): topics covered in this course include: Introduction to cartography; Notions about ellipsoidal geodesy; Classification of cartographic projections; Gauss-Kruger projection; Stereographic 1970 projection. Local projections. Laboratory includes practical applications on coordinate calculation and transformation, cartographic tiling and nomenclature, geodetic transformations.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cadaster I	CAD1	5	2	-	2	-

Course description (Syllabus): the discipline covers the following: General introductory concepts; The land of Romania; Problems of geo-topo-cadastral map; Geodetic networks; Calculation and parceling surfaces; Systems, modern surveying equipment and instruments.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
National and Local Geodetic Networks	RGNL	4	2	-	2	-

Course description (Syllabus): The objective of the course is to provide knowledge about the design and realization of the following types of geodesic networks: triangulation networks, leveling networks. In this way, the position in space of a point in the geodetic triangulation network is currently defined with respect to two different surfaces: on the one hand the ellipsoid for coordinates B, L or the projection plane for coordinates x, y and on the other hand, the geoid or quasi-geoid for altitude H, depending on the officially accepted system. One of the current problems is the

determination of the spatial position of the geodesic points, in relation to a single surface, usually in relation to the reference ellipsoid, a method called three-dimensional geodesy.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Land Use Planning and Ecology	OTE	4	2	-	2	-

Course description (Syllabus): Course refers to possibilities to planning the lands from agriculture and forestry with suggestions for each land use: arable land, orchards, vineyards, meadows, pastures and forests. Topics covered in this course include: Land planning between agriculture companies. Land planning of agriculture company. Planning of arable land. Planning of orchards and vineyards. Planning of meadows and pastures. Forest planning.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geometric Basis of Photogrammetry	BGF	4	2	-	2	-

Course description (Syllabus): The objectives of this course are the presentation of geometric basic principles of photogrammetry. Topics covered in this course include: line geometry, plane geometry and space geometry.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geodesic, Cadastral and Photogrammetric Information Systems	SIGCF	4	2	-	2	-

Course description (Syllabus): Presenting the main principles of geodesic information systems. Knowing different GIS software that works on the same principle. Using the created database for the execution of projects.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Engineering Measurements I	MI1	4	2	-	2	-

Course description (Syllabus): The subject course is to presents the field and problems of engineering measurements, methods for topographic preparation, mapping altimetry and planimetry elements, methods for plotting the constructions in horizontal and vertical elevation and also general particular features of networks mapping.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cadaster II	CAD2	4	2	-	2	-

Course description (Syllabus): Introduction to general cadastre in Romania; Basis of the general cadastre mapping; Making basic cadastral plan; Basic cadastral data recording; Cadastral plans.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cadaster project	PRCAD2	2	-	-	-	2

Course description (Syllabus): The objective of the course is to provide knowledge about how to perform field measurements, to transfer data from topographic instruments, to perform topographic calculations with specialized software. After calculating the coordinates of the detail points, various cadastral technical documentation regulated by the regulations and the national legislation in force will be carried out.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Photogrammetry I	FOTO1	4	2	-	2	-

Course description (Syllabus): The objectives of this course are the presentation of principles used in analogical photogrammetry and the methods used in exploitation of aerial photographs and stereopair for obtaining the plans

and maps. Topics covered in this course include: Introduction. Aerial photogram and stereopair. Optical bases of photogrammetry. Photographic bases of photogrammetry. Stereoscopic vision. Preparation of control. Airborne photographic survey. Photogrammetric rectification. Exploitation of stereoscopic model.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Transportation Infrastructure	CCIT	3	2	-	2	-

Course description (Syllabus): The course targets the following: Introduction, planning and design, construction and features, management and maintenance. The aims are to acquire knowledge regarding the design, construction and management of transport infrastructure in Romania that is available to all sectors of the industry, engineers, as well as students of cadastre.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Professional Training	PRSP	4	-	-	-	60 hours

Course description (Syllabus): Topics covered in this course include: Field data collection. Data processing. Drafting the projects. Drawing parts. The practice is performed at specialized companies.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cartographic Projections	PC	4	2	-	2	-

Course description (Syllabus): Topics covered in this course include principal cartographic projections: classification of cartographic projections, compliant projections, equivalent projection.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Satellite Geodesy	GS	5	2	-	3	-

Course description (Syllabus): topics included are: GPS positioning system components; Coordinate systems used in GPS technology; Time systems; Orbits of artificial satellites of the Earth; Satellite signals; Positioning with GPS technology; Processing of satellite observations; Geodetic networks determined by GPS technology.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Automatic Processing of Geodetic Data	PADG	5	2	-	2	-

Course description (Syllabus): topics included are: data downloading from field equipment, data processing and map drafting, based on the resulted information.

4st Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Real Estate Valuation	EBI	4	2	-	2	-

Course description (Syllabus): Economic part of the cadastre: economic importance of land, cadastral assessment of agricultural land, average score, corrections. Agricultural land valuation: cadastral net income as a basis for tax and tax determination, methods. Evaluation of construction and buildings, methods used in Romania.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Photogrammetry II	FOTO2	5	2	-	1	2

Course description (Syllabus): The objectives of this course are the presentation of digital photogrammetric principles used in airborne photogrammetry and the modalities of processing the digital images. Topics covered in this course include: Digital images; Digital photogrammetric sensors; Digital aerial cameras; Photogrammetric scanners; Digital terrain models; Direct and indirect determination of remote parameters; Digital airborne triangulation; Processing of digital aerial images; Digital orthophoto mapping; Digital photogrammetric systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Engineering Measurements II	MI2	4	2	-	1	-

Course description (Syllabus): The course comprises detailed elements topographical measurement for civil and industrial buildings, topographical elements to design the main structure of the mobility networks (roads, railways a.s.o). Also, are presented some specific features regarding the problems that could occur in the field of bridges, culverts and dams etc, in accordance with some specific situations.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Engineering Measurements Project	PRTIG2	2	-	-	-	2

Course description (Syllabus): Designing of a special network for engineering measurements by different methods: closed traverse, open-end offshore traverse, polar coordinates.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Remote Sensing	TELE	5	2	-	2	-

Course description (Syllabus): The objectives of this course are the presentation of general and specific aspects of passive and active remote sensing. Topics covered in this course include: Ways registration of satellite images. Satellite sensors. Satellite images. Geometrical distortions on the satellite images. Satellite programs. Processing and interpretation of satellite images. Applications of remote sensing.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Urban Networks	RED	4	2	-	1	-

Course description (Syllabus): The course targets follow the main aspects: Providing knowledge regarding the urban networks (technical - urban and street networks) which could provide accessibility and functionality for a specific area (residential, industrial exploitation, agricultural, tourism, etc.). Developing the knowledge needed to carry out the plans for urban networks. Developing the skills for drawing urban networks.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
General Law	ID	2	1	1	-	-

Course description (Syllabus): The course aims at acquiring knowledge of law with implications in engineering surveying about knowledge of the theoretical and practical aspects of the legal act, acquiring property and rights derived, characterization of the contract as a source of obligations. Topics covered in this course include: Civil Law. General terms, Civil legal relationship, Civil legal act, Primary real rights, General theory of obligations, Special contracts and Succession.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Hydrotechnical Constructions	CH	3	2	-	1	-

Course description (Syllabus): First Part: Basic notions about rivers and watersheds concerning the terrestrial measurements and cadastral activity: Introduction in discipline problematic. The place and role of terrestrial

measurements and cadastre, in watersheds management context. River and watersheds characteristics of interest for terrestrial measurements and cadastral activity. Notions on river hydrology. Notions of applied hydraulic. Processes generated by water in hydrographic watersheds. **Second Part:** Management, constructions and activities in watersheds concerning terrestrial measurements and cadastral activity: Torrential hydrographic network management constructions. Riverbed regularization constructions. Water accumulations and hydro-energetically constructions. Constructions for stopping landslides. Irrigation constructions and installations.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Land and Urban Planning	ATU	3	2	-	2	-

Course description (Syllabus): Basic concepts, Legal regimes, The legal framework; Documentation of urbanism. General Urban Plan. Zonal Urban Plan. Detailed Urban Plan. Procedure of authorization.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geodetic Management	MLC	2	2	-	1	-

Course description (Syllabus): This course gives information regarding activities from cadastral companies as part of economic system including creation of company and its management. Topics covered in this course include: Introduction. Company. Management of company. Manager types and methods of management. Management of human resources. Work standards. Planning of cadastral works.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Land Surveying in Mining Operations	MS	4	2	-	1	-

Course description (Syllabus): The objective of the course is to provide knowledge about land surveying characteristics in mining operations and areas (above or underground) in accordance with some particular features. The course gives an introduction to mining activities, then it presents the geodetic and land surveying features of mining operations, information system of mining operations and mapping of the mining operations.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cadastral Law	LFC	3	2	-	2	-

Course description (Syllabus): the discipline includes the following: Notions regarding the ownership; Real estate; Regulatory developments concerning restoration of property rights on land ownership; The regulations in the field of cadaster, geodesy and real estate in Romania. The regulatory system in the European Union.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Elaboration of the BSc Thesis	PRD1	4	-	-	-	4

Course description (Syllabus): The objectives of this course are the diploma project preparation and are specific for every discipline from the geodetic engineering. General topics covered in this course include: Field data collection. Data processing. Drafting the projects. Drawing parts.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Geographic Information Systems	GIS	4	2	-	2	-

Course description (Syllabus): Presenting the basic concepts of a geographic information system; Using GIS in the management of land resources; Digital maps in raster and vector format. Technology used to create digital cartographic databases; Using the databases for projects.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Special Land Surveying	RTS	4	2	-	2	-

Course description (Syllabus): Survey of building and underground networks, industrial enclosures, ports and airports. Land survey for the design and building of airports. Land survey for tunnels. Land survey for road building. Land survey for railway transport. Earthwork movement and calculation. Land survey for rivers, watersheds, lakes and seashore. Water and hydrology cadaster.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Monitoring of Land and Constructions	UCTC	2	1	-	1	-

Course description (Syllabus): Objectives of monitoring buildings. Classification of buildings according to the pursued precision. Stages of building monitoring. Methods of measurement. Classification of movements and deformations of buildings and lands. Geological factors that influence the phenomenon of displacement and deformation of the land surface. Parameters of displacement and deformation process. Geodetic monitoring networks. Types. Permanent marking of survey points. Geodetic measurement methods for determining horizontal displacements. Geodetic measurement methods to determine vertical displacements. Determination of inclination of buildings. Monitoring of buildings. Monitoring of bridges.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practice for the Elaboration of the BSc Thesis	PRD2	5	-	-	-	-

Course description (Syllabus): The objectives of this course are to perform the data collection for development of diploma project in geomatic engineering. Topics covered in this course include: Field data collection. Data processing. Drafting the projects. Drawing parts.