

UNIVERSITY OF WEST HUNGARY
FACULTY OF GEOINFORMATICS

Main features of the credit system, peculiarities of the branches

In the Hungarian higher education **credits** are for measuring the fulfillment of the study requirements in the curriculums alongside with the marks. In 2000 the Government issued a decree (200/2000) about the obligatory introduction of the credit system in the higher education. This system uses the concepts and methods of the European Credit Transfer System at a large scale.

The essence of the system: obtaining the degree is subject to a certain amount of verified study work. For the fulfillment of the educational requirements the students get credit points. This is an index-number proportional to the study time. The whole study time for an average student is incorporated in the model curriculums of the institutions. This study time includes not only the lessons but also the time which is needed for the students for individual preparations (in the examination session as well). According to the international agreements 30 study hours equal 1 credit point. The number of the credit points coming from the certain subjects, those which can be collected during the semesters (basically 30), the whole credit number necessary for the degree and for the qualification (in the traditional college training 180, in the BSc basic training 180+30 is in the model curriculum as well.

Students can get credits if they account for their knowledge. Forms of examining: examinations, mid-term grades, reports. In the case of the examinations and the mid-term grades five grades are used, in the case of the reports there are three grades: well-done satisfactory, unsatisfactory. Credit points can be obtained only if the qualification is at least a two or a satisfactory.

The number of the credit points shows the progress in the training as well. The credits accumulate and only a certain number of them can lead forward.

Following the ECTS, there are three subject categories in our model curriculum: Obligatory subjects (A), Obligatory-optional subjects(B) and Electives (C).

Students get credit points for the time of their practice and for a successful dissertation as well.

The credit system relieves the restriction of the former educational systems creating the possibility of a more flexible training discipline with more choice.

Following the model curriculum the qualification can be obtained within an optimal time but at the same time it enables the students to organize their individual curriculum after the first few semesters with regard to how the subject are built on one-another. They do not have to repeat semesters any more. Subjects can be taken repeatedly – under certain circumstances - ensuring a continuous process.

The introduction of the new system promotes the acknowledgement of training in other institutes and the completion of part-time studies in other universities (even abroad).

The Educational and Subject-Admitting Board has an important role in the credit system. Both experienced professors and students work in it. This board is directed by the vice-dean of the faculty, the secretary is from the Educational Office. The Educational and Subject-Admitting Board decide on the requests of the students in the choices listed above.

Study programmes:

Land Surveying and Land management Specialization (BSc)

Head of Specialization: Prof. Dr. Béla Márkus professor (mb@tgeo.info.hu)

Consultant Committee: Education Committee

Educational goal: Training of engineers for land management, within this for national survey and for map-making, who are able to do the basic land surveying jobs, familiar with the up-to-date equipment, the measuring and the adaptation procedures, take part in environment protection and hazard prevention projects and are willing to broaden their knowledge in organized or self-supported courses.

Specialists with a land surveyor diploma are able to solve the geodetic problems below:

- Basic land surveying jobs (determination of control points, large-scale maps, making and renewing of topographic maps);
- Preparing precise and detailed measurements for all kinds of technical jobs in economy with modern methods;
- Preparing of land surveying, geoinformation, remote sensing documents for the development of towns, villages, industrial estates and other industrial establishments.
- Planning and designing the land survey as part of the national administration;

Structure of Training:

Training time: 7 semesters

Minimum number of lessons for full-time: 2700 hours +600 hours practicals, 600 hours + practicals for correspondent courses

Obtainable credit points: minimum 210

Level of degree: college degree (BSc)

Specialization: land surveying engineer specialized in land management or in geoinformatics or in land cadastre

Forms of Education: full-time, correspondent courses

Educational and Examinational Requirements:

System of knowledge tests:

Compulsory examinations are: 31

Marks within the semesters: 7-10 resp.

Coverage: 7-9 resp.

Session examinations: 0

Rules for finding educational averages: weighted educational average

Contents of Course

Subject - Fields	United credit points	Rate within the educational activity, %
<u>Natural-scientific and engineering studies</u> Mathematics I-III., Geometry I-II, Physics, Informatics I-II. , Environmental studies	36	17,1
<u>Economy and humanities</u> Economy, State and jurisprudential studies, Communication, Organization and Management	13	6,2
<u>Professional subjects:</u> Mapping, Geodesy I-II, Basics of engineering I_II., System organization, Projections, Photogrammetry I-II., Geoinformatics I-II., Adjustment, Control point networks, Topography, Land registry, Large scale mapping I_II., Land use and environmental protection	75	35,7
<u>Differential professional Studies</u> <i>Specialization in Geoinformatics:</i> Precision geodesy, GPS, GIS applications, Project week I-II., Engineering Surveying, GIS Management, Remote Sensing, Cartography <i>Specialization in Land Management:</i> Engineering Surveying , GIS applications , Photointerpretation and remote Sensing, Project week I-II., land and urban management I-II., Organization and management 2., Urban studies, Rural and urban development <i>Specialization in land cadastre:</i> Land registry II., Studies in civil law, Estate development, utilization of estates I-II., Estate law I-II., Land and urban management I-II., Administrative law, , land and estate evaluation, Agrarian law	31	14,8
<u>Optional subjects</u>	10	4,8
<u>Practical studies</u> (2x3, 1x1 weeks institutional practice and 7 weeks workshop practice)	30	14,3
Thesis	15	7,1
Altogether	210	100%
<i>Language classes</i>	4 hours/week during 4 semesters	

Practical studies: Geodesy (3 weeks), Surveying (3 weeks), Topography (1 week), workshop practice (min. 10 weeks)

State exam criteria:

For sitting for the exam:

- At least 195 credit points and the fulfilling of the criteria in the curriculum,
- Signature for the thesis,

Parts of the state exam:

- Defending of the thesis (15 credit points),
- Complex state exam (from subjects equal to 15-30 credit points)

Requirements of the thesis: It should prove that the candidate is able to apply in practice the given knowledge, to gather data, to evaluate, to conclude, to form an opinion, to use specialized literature and to summarize the results.

The result of the state exam: the arithmetic middle of the thesis and the oral exam

The condition of issuing the diploma: accredited, basic level foreign language examination .

The result of the diploma: arithmetic middle of the state exam and the weighted educational average for the whole training.

<i>Qualification of the diploma:</i> prominent	4,50 – 5,00	good	3,50 – 4,49
satisfactory	2,50 – 3,49	sufficient	2,00 – 2,49

Description of courses offered in English:

PhD Program in Geoinformatics

The head of the Doctoral Program is Prof. Dr. Béla Márkus.

The students graduated (MSc) from UWH, Faculty of Forestry in forestry environmental protection and wildlife management are first among the candidates. Moreover, the accreditation of MSc specialisations in Land consolidation and Geoinformatics is in progress as well.

In addition anybody can enrol in the doctoral program who has a university degree or has a lecturer diploma in forestry, wildlife management, GIS, remote sensing, photogrammetry, geodesy, land surveying and management, environmental studies, geography and mapping, and their prequalification enables them to carry on scientific activity.

It is an advantage at the entrance examination if the candidate has a professional postgraduate diploma or complementary knowledge as an engineer-teacher.

The aim of the PhD is to advance knowledge and the application of knowledge through the preparation of a substantial thesis which represents a significant contribution to a particular field of study in geoinformation sciences. It can be connected to numerous special research tasks and it can contribute to the complexity of research and spatial analysis.

The Program accepts students in doctoral degrees by research in a large range of Geoinformatics related discipline areas including:

- Environmental studies,
- Forestry,
- Geodesy,
- Geography,
- GI Science,
- Land management,
- Land surveying,
- Mapping,
- Photogrammetry,
- Remote sensing,
- Spatial planning,
- Surveying,
- Wildlife management.

Besides this anybody can enrol in the doctoral program who has an MSc degree and whose prequalification enables them to carry on scientific activities on the basis of professional experience or published research work.

The doctoral degree can be attained by attending a university educational training as a regular, evening extension course PhD student or by an individual teaching program.

The duration of the training is 3 years, 36 months. The PhD students should collect at least 180 credit points during this period.

The program has compulsory subjects (5 credits/subject) and elective/optional subjects (4 credits/subject).

Compulsory subjects (5 credits each)

1. Applied mathematics (Dr. Horváth Jenő)
2. Informatics (Dr. Gál János)
3. Planning and evaluation of experiments (Dr. Horváth-Szováti Erika)

Elective subjects (4 credits each)

1. Geomathematics (Dr. Závoti József)
2. Modeling of spatial processes (Dr. Márkus Béla)
3. Systems and standards of Geoinformatics (Dr. Mihály Szabolcs)

Optional subjects (4 credits each)

1. Geodetic projections (Dr. Bácsatyai László)
2. Algorithms in geoinformatics (Dr. Czímber Kornél)
3. Strategic questions of the information society (Dr. Detrekői Ákos)
4. Land valuation, -quality increment and decrement (Dr. Dömsödi János)
5. Land use, landscape use (Dr. Dömsödi János)
6. New technologies in the digital photogrammetry (Dr. Jancsó Tamás)
7. Digital image processing in geoinformatics (Dr. Kalmár János)
8. Land law, environmental law, law in environmental protection, water law, law in land registry (Dr. Kurucz Mihály)
9. National spatial registry systems in agriculture (Dr. Martinovich László)
10. Digital terrain models (Dr. Márkus Béla)
11. Regional climate modeling and prognostics (Dr. Mátyás Csaba)
12. Digital topography (Dr. Mélykúti Gábor)
13. Global and local geodynamics (Dr. Mentés Gyula)
14. Methods of regional statistics (Dr. Mészáros József)
15. Remote sensing and geoinformatics in the location-specified crop farming (Dr. Neményi Miklós)
16. Legal questions in GIS (Dr. Osztoivits András)
17. Application of thematic maps based on GIS (Dr. Pődör Andrea)
18. Corporation economics (Dr. Székely Csaba)
19. Rural development and environmental protection (Dr. Udvardy Péter)
20. Satellite based resource exploration and its application (Verőné Dr. Wojtaszek Malgorzata)
21. Engineering geodesy (Dr. Alojz Kopáčik)
22. Environmental economics (Dr. Ángyán József)
23. Application of GNSS systems in the environmental studies (Dr. Bányai László)
24. GNSS in engineering geodesy (Dr. Borza Tibor)
25. Application of GNSS with high accuracy (Dr. Kenyeres Ambrus)
26. Possible applications of geoinformatics in the environmental context (Dr. Kertész Ádám)
27. Land valuation (Dr. Lóczy Dénes)
28. Mathematical Geodesy and Map Projections (Dr. Reiner Jäger)
29. International Land Management (Dr. Reinfried Mansberger és Dr. Walter Seher)
30. GIS Environmental modeling (Dr. Tamás János)
31. Geoinformatics methods in environmental protection (Dr. Vekerdy Zoltán)

Short courses offered in English:

University of West Hungary Faculty of Geoinformatics	
Course name	Building Geodatabase
ECTS:	3
Semester:	winter / summer
Department:	Geoinformatics
Teacher:	Dr. Ferenc Végső
Description:	Designing of Geodatabase Spatial thinking in the practice Defining geodatabase Definig layer structure Data integration Building layer(s) by digitising Editing and cleaning feature set Filing up attribute tables Creating own geodatabase Validation by field work
Method	The course based on personal contact. The first part is conducted by teacher, it's takes about 8-10 hours. The second part is guided by teacher, but mainly based of own work of student(s). It's takes 10-14 hours. The third part (field practice) supervised by teacher, it's takes about half a day. The used software is ArcGis ver. xxx.

University of West Hungary Faculty of Geoinformatics	
Course name	Data Acquisition and integration
ECTS:	3
Semester:	winter and summer
Department:	
Teacher:	Dr. Tamas Jancso, Dr. Andrea Pödör, Dr. Veróné Wojtasek Marlgorzata, Dr. György Busics
Description:	<p>The course gives an overview about the data acquisition methods and the derived products in surveying, GPS technology, laser scanning, photogrammetry and remote sensing. The students will get knowledge about the up-to-date sensors, evaluation procedures emphasizing the connection and integration between the different methods.</p> <p>The course is separately dealing with the problem how to integrate the gained data and products into a GI system in order to give possibility to derive secondary data from the primary data sources. Upon completion of the course the students should know:</p> <ul style="list-style-type: none"> •the methods and sensors of data acquisition in surveying, GPS, laser scanning, photogrammetry and remote sensing, •the evaluation procedures and application areas of the derived products, •data integration procedure into a GI system.
Method	<p>Distanc e-learning through Internet using the Blackboard system. Standards are : English language, 90 hours workload, 13 online contact lessons, supervision and exams executed by the providing GI institute.</p>

University of West Hungary Faculty of Geoinformatics	
Course name	Web application development
ECTS:	2
Semester:	<u>winter</u> / <u>summer</u>
Department:	Department of Geoinformation Science
Teacher:	Laszlo Kottyan
Description:	<p>In this course you will learn the advanced Web technologies, including server-side programming, accessing databases over the Internet and browser scripting. You will understand the Web standards and how the Web works. You will use tools in order to give GIS functions to a Web application.</p> <p>During the semester you will do exercises and built an own application.</p>
Method	<p>The course unit actually offered in a term.</p> <p>This is a practical course with tutoring.</p> <p>Assesment: at the end of the course the student is awaited to present his application.</p>

University of West Hungary Faculty of Geoinformatics	
Course name	Land using and environment protection
ECTS:	3
Semester:	winter / summer
Department:	Geoinformatics
Teacher:	Katonáné Gombás Katalin
Description:	<p>Aims: The students are given knowledge about the soil set of Hungary, agriculture and nature conservation of soil using, and their connections.</p> <p>Main topics:</p> <ul style="list-style-type: none"> • Land using in Europe, and in the Carpathians Basin • The climatic and environmental facilities of Europe • The land cultivation's development and the changes of the landscape • Categories of production sites and soil types. • Plant growing and allocation systems. • Forestry. • Environment protection and nature conservation. <p>Literature:</p> <ol style="list-style-type: none"> 1. Ángyán J. szerk.: Magyarország földhasználati zónarendszerének kidolgozása az EU csatlakozási tárgyalások megalapozásához, GATE Környezet-és Tájgazdálkodási Intézet kiadása, Gödöllő, 1998. 2. Dömsödi János_ Szalai T.: Mezőgazdasági földhasználat, egyetemi jegyzet, GATE, Gödöllő, 1997. 3. Katonáné Gombás K: környezet-és természetvédelem, Kézirat, NYME GEO, Jegyzetszorosító Részleg, Székesfehérvár, 2002. 4. Normann J.G. Pounds: Európa történeti földrajza, Osiris Kiadó, Budapest, 1990. 5. Nyíri L. szerk.: Földműveléstan. Mezőgazdasági Kiadó Budapest, 1993. 6. Rakonczay Z: Természetvédelem, Mezőgazdasági Szaktudás Kiadó, Budapest, 1995.
Method	Project based learning. Students have to know the basic ideas of the topics and their applications on their field.

University of West Hungary Faculty of Geoinformatics	
Course name	Spatial Databases by Open Standards and Softwares
ECTS:	3
Semester:	winter and summer
Department:	Department of Geoinformation Science
Teacher:	NAGY, Gábor
Description:	<ul style="list-style-type: none"> ● Relational databases and Database Systems ● Structured Query Language (SQL) ● OGC Simple Features – SQL (OGC Standard) ● PostgreSQL and PostGIS softwares ● Queries with Spatial Functions and Operators ● Using PostGIS Databases from desktop GIS softwares
Method	<p>The theory learn by digital sources (standards, program documentations, etc.) and personal or remote meetings.</p> <p>We use the related programs in the computer labs of the Faculty, but the students could use this programs in theirs own computer.</p>

University of West Hungary Faculty of Geoinformatics	
Course name	Spatial Analysis
ECTS:	4
Semester:	winter / summer
Department:	Geoinformatics
Teacher:	Prof. Dr. Béla Márkus
Description:	<p>Aims: The basic principles, algorithms and computational methods in Geographical Information Science will be introduced. The students will be able to explain the strategy, theory and rules of data analysis, to use GIS as a tool in the practice, to handle data errors in processing data and visualizing information. The subject additionally will give an overview of GIS planning and implementation using a project-based educational approach.</p> <p>Main topics: Fundamentals of spatial analysis. Simple spatial operations: distance and area calculations, spatial queries, statistical methods. Transformations: vector-raster, raster-vector. Neighbourhood functions: buffer generation, grouping, filtering.</p> <p>Multiple spatial operations: vector and raster overlay, Boolean and arithmetic operations, map algebra, spatial filtering.</p> <p>Digital elevation models and modelling. Spatial interpolation methods: basic, elementary and complex functions. Surface analysis. Catchment delineation.</p> <p>Network analysis: location and allocation.</p> <p>Spatial decision making. Examples. Cartographic modelling. General steps involved in traditional approach, Assumptions involved with this type of analysis.</p> <p>Practical problems. Error handling: eliminating sliver polygons, positional and thematic accuracy, metadata, planning. Visualization.</p> <p>Basics of GI project management. GIS in organisations. Future of GIS.</p> <p>Literature: Compulsory reading: 1. Core Curriculum in GIScience, NCGIA, Santa Barbara, CA, 2000, http://www.ncgia.ucsb.edu/giscc/</p> <p>Recommended reading: 1. GIS Core Curriculum for Technical Programs, NCGIA, Santa Barbara, CA, 1998, http://www.ncgia.ucsb.edu/education/curricula/cctp/ 8. Longley, P.A. – Batty, M.: Advanced Spatial Analysis, ESRI Press, Redlands, CA, 2003.</p>
Method	Project based learning. There are 6 module of lectures. Students should prepare 6 assignments during their study. Software: ArcGIS 9. In the computer lab students are working on their own, and advised by the teacher if needed.

University of West Hungary Faculty of Geoinformatics	
Course name	Geoinformation management
ECTS:	2
Semester:	winter / summer
Department:	Geoinformatics
Teacher:	Prof. Dr. Béla Márkus
Description:	<p>Aims: The basic principles, methods and some practical tools in Geographical Information Management are introduced. The subject also dealing with GIS planning and implementation. Special emphasis is given to the introduction of team-work skills.</p> <p>Main topics: Fundamentals of Information Management, strategic planning, basic elements of systems and influence of the environment. Basics of GIS project management, project initiation, user needs analysis, user oriented project planning and documentation, logical framework matrix, Gantt-diagram, cost-benefit analysis, data-information matrix, proposals, total quality management, change management, marketing and monitoring. Process and milestones of GIS implementation from tendering to benchmarking, piloting and continuous operation. GIS in organisations. Future of GIS.</p> <p>Literature: Compulsory reading: 9. Frank A. - Raubal M. - van der Vlught M.: PANEL - GI Compendium, Geoinfo Series nr. 21, Vienna, 2000.</p> <p>Recommended readings: 1. Tomlinson, R: Thinking about GIS, ESRI Press, Redlands, California, 2003. 2. BEST-GIS: Guidelines for best practice in user interface for GIS, Genoa, Italy, 1998. 3. Calkins H. et al.: Geographic Information System Development Guides, NCGIA CC, Unit 136. 4. Nebraska Guidebook for a Local Government Multipurpose Land Information System, http://www.calmit.unl.edu/gis/LIS_Std_Intro.html, 2000. 5. NCGIA Core Curriculum, Volume 3, SE FFFK, Székesfehérvár, 1994.</p>
Method	Project based learning. Students should prepare step-by-step a GI project proposal and submit at the end of the study. Each step involves a written assignment and an oral presentation, both advised by the teacher.

University of West Hungary Faculty of Geoinformatics	
Course name	The Practice Real Estate Valuation
ECTS:	4
Semester:	winter / summer
Department:	Geoinformatics
Teacher:	Mizseiné Dr. Nyíri Judit
Description:	<p>Aims: The objective of this module is to give an overview on products and services of real estate market. On completion of this module students can gain knowledge on real estate marketing including market research and market analysis. These skills help the appraiser determine the real value of different kinds of properties. Aim of the subject is to give knowledge to students about the agricultural land evaluation. The students get detailed knowledge about the arable land evaluation and about the compensation.</p> <p>Main topics: The objective of this module is to give an overview on products and services of real estate market. On completion of this module students can gain knowledge on real estate marketing including market research and market analysis. These skills help the appraiser determine the real value of different kinds of properties. Aim of the subject is to give knowledge to students about the agricultural land evaluation. The students get detailed knowledge about the arable land evaluation and about the compensation.</p> <p>Literature:</p> <ol style="list-style-type: none"> 1. Mizseiné Nyiri Judit (1999): Földminősítés és értékbecslés II. (Ingatlan-értékbecslés), Ingatlankataszteri Szakmérnöki továbbképzés jegyzete, SE FFFK, Székesfehérvár. 2. Hajnal I. (1995, 1999): Az ingatlan értékelés Magyarországon, BME Mérnöktovábbképző Intézet, Budapest. 3. TEGOVOFA: Útmutató az állóeszközök értékeléséhez. (Fordítás), FÜTI OMEGA Kft.-Proconsult, Budapest. (1994). 4. Dr.Hajnal István: Ingatlanfejlesztés Magyarországon, Budapest, 2000 (BME Mérnöktovábbképző Intézet 5. Land valuation
Method	Land evaluation as a concept, practical questions Current situation and development of land and estate evaluation, natural resources and their role in evaluation, European methods, EVS (European Valuation Standard), real estate register of municipalities, legal background of evaluation, Mathematical background of evaluation, evaluation methods, European methods of evaluation.