SZÉCHENYI ISTVÁN
UNIVERSITY
GYŐR

BSC PROGRAM IN CIVIL ENGINEERING

COURSE CATALOGUE
ECTS INFORMATION PACKAGE

2006

Felelős kiadó: *Dr. Koren Csaba*

Borító: Ad-Art Studio

Szerkesztette: *Borsos Attila*
Műszaki szerkesztő: *Horváth Zsolt*
Készült 2006-ban, 100 példányban,
az LRG Kft. gondozásában.

Contents

1) Foreword

In modern usage, civil engineering is a broad field of engineering that deals with the planning, construction, and maintenance of fixed structures, or public works, as they are related to earth, water, or civilization and their processes. Most civil engineering today deals with roads, railways, structures, water supply, sewer, flood control and traffic. In essence, civil engineering may be regarded as the profession that makes the world a more agreeable place in which to live.

(From Wikipedia, the free encyclopedia)

Civil engineering has relatively long traditions at Széchenyi István University. The first BSc program in civil engineering started with the foundation of the predecessor college of the university in 1968. The nominal duration of this program was 6 semesters. In 2001, a 10 semester MSc program was launched, running parallel to the short cycle program.

As a result of the Bologna-process, most fields of higher education in Hungary are being transformed into a two-cycle system. The length of the first cycle in most disciplines is 3 or 3.5 years, whereas in civil engineering – due to its broad scope – the new BSc program takes 4 years. The second cycle master (MSc) programs in civil engineering will cover 1.5 years.

At Széchenyi István University the new BSc program in civil engineering started in September 2005. This booklet contains a general description of the program, a description of course contents together with some general information for foreign students.

Although the language of the training is Hungarian, foreign students are welcome for an industrial placement semester or diploma thesis preparation. The booklet can also be useful for Hungarian students to demonstrate previous studies when spending some time at a foreign institution.

Prof. Csaba KOREN
Co-chair of the program committee
Vice-rector

2) Information of the institution

2.1) Basic data of the university

Name: Széchenyi István University
Address: Egyetem tér 1.
Győr
H-9026
Hungary
Tel: +36 96 503-400
Fax: +36 96 329-263
Internet: http://www.sze.hu
E-mail: sze@sze.hu

Rector: *Prof. Tamás SZEKERES*
Administration building 203. (Igazgatási épület)
Tel.: 503-401
Fax: 503-406
E-mail: szekeres@sze.hu

2.2) General description of the institution

The University was founded in 1968 as the Polytechnic of Transportation and Telecommunication. Its predecessors were located in Budapest and Szeged. The various buildings of the new campus in Győr were built between 1971 and 1977. During the 1970's and 1980's the institution strove to satisfy the need for polytechnic-level engineering training raised by the two determinant infrastructural branches, namely transportation and telecommunications. After the 1990 change of political system, the institution remained active in its activity in traditional training areas, but also entered several new fields by allotting its development funds to meet the labour expectations of the prosperous economy of the region and the demands of multinational companies which had settled in the region. With the Parliament of the Hungarian Republic's decision of the 11th December 2001 Széchenyi István University was lifted to full university status from 1st January 2002.

The aim of the University is to provide higher education leading to BSc, MSc and PhD degrees in various fields, to offer post-graduate courses and to carry out research, consultancy and other professional activities. Over the years, the specialist fields covered by the University have been extended considerably.

Presently (2006), the following programs are available:

BA	International administration management
BA	Public administration management
BA	Business and management
BA	International studies
BA	Trade and marketing
BSc	Civil engineering
BSc	Municipal engineering
BSc	Architectural engineering
BSc	Environmental engineering
BSc	Electrical engineering
BSc	Information technology

BSc	Informatics of economics
BSc	Mechanical engineering
BSc	Mechatronics engineering
BSc	Transportation engineering
BSc	Engineering management
BSc	Vocational technical instructor
BA	Social work
BA	Health management
BA	Nursing and medical care
BA	Music teacher

MSc	Architectural engineering
MSc	Civil engineering
MSc	Transportation engineering
MSc	Municipal engineering

MA	Business and management
MSc	Informatics of economics
MA	Law

PhD	Business and management
PhD	Law
PhD	Information technology

PhD	Civil engineering
PhD	Transportation engineering

About 7500 full-time and 5200 part-time and distance learning students are registered at the Institution in 2006. The number of academic staff is about 300, including about 140 professors and associate professors.

There are two semesters in each year with 15 weeks for lectures and 6 weeks for exams. The first semester starts at the beginning of September and the second at the beginning of February.

3) Information on the BSc program in Civil Engineering

3.1) Goals of the program

The goal of the program is to train well-prepared civil engineers, who are capable of fulfilling design, construction, maintenance and operational, corporate and authority tasks, they are able to work on planning and development projects independently, having a command of a foreign language.

Taking into account their specialisations, our civil engineers can:
- get design licences after the required professional practice,
- work out common development tasks independently,
- provide considerable contribution to complex engineering design.

In the whole field of civil engineering our graduates can:
- take up technical manager duties,
- take up technical supervisor duties,
- work in constructional, maintenance and operational, corporate and authority fields,
- fulfil urban engineering tasks.

3.2) Program content

Duration: 8 semesters
ECTS credits: 240 credits. 1 local credit = 1 ECTS credit.

Program structure:

Fields	Credits	%
Natural sciences	51	21
Economic and human studies	24	10
Compulsory professional subjects	100	42
Specialised professional subjects	50	21
Diploma thesis work	15	6
Total	240	100

Specialisations offered:
- Transport infrastructure
- Structural engineering
- Municipal engineering

Compulsory industrial placement: minimum 4 weeks

3.3) Requirements

Diploma thesis work requirements:

In their diploma thesis work students work out a concrete civil engineering task or do some research work. This has to be done during one semester based on university studies, literature survey and with the assistance of supervisors. With the diploma thesis work the candidate proves that he/she acquired the necessary proficiency to use the theoretical knowledge in practice, is able to fulfil the analyser, designer function of a civil engineer, and can use professional literature productively.

Requirements to be met before the final state exam:
- 240 credits (including 15 credits for the diploma thesis work),
- completed industrial placement,
- approved diploma thesis by an internal as well as an external consultant.

Further requirement to get the degree:

You should have an oral or written intermediate level exam of a foreign language (English, German, Italian, French, Spanish or Russian). It is equivalent to the B2 level of the Council of Europe Common European Framework of Reference for Languages.

Contents of the final state exam:
- oral presentation of the diploma thesis work,
- oral exam of fixed and chosen professional courses amounting to at least 20 credits.

Degree qualification:

Average of three marks: the oral presentation of the diploma thesis work, the final oral exam and the weighted average of all completed courses during the program.

Program committee:

Chair:	*Prof. László GÁSPÁR*
Co-chair:	*Prof. Csaba KOREN*
Program coordinator:	*Prof. Ferenc HORVÁT*
Members:	*Prof. Péter SCHARLE*
	Assoc. Prof. Zoltán HORVÁTH
	Assoc. Prof. László LUBLÓY
	Assoc. Prof. Róbert SZEPESHÁZI
	Assoc. Prof. József SZABÓ

Description of the institutional grading system:

5 = excellent
4 = good
3 = medium
2 = satisfactory
1 = failed

3.4) List of courses

Compulsory courses

Course code		Title	Credits
1.	NGB_AK002_1	Economics	4
2.	NGB_EP001_1	Descriptive geometry	4
3.	NGB_EP002_1	Building materials I.	3
4.	NGB_EP002_2	Building materials II.	4
5.	NGB_EP003_1	Buildings I.	4
6.	NGB_EP003_2	Buildings II.	4
7.	NGB_EP003_3	Buildings III.	3
8.	NGB_ET001_1	Computer graphics	4
9.	NGB_ET003_1	Quality management	2
10.	NGB_ET004_1	Construction management I.	4
11.	NGB_ET004_2	Construction management II.	4
12.	NGB_ET005_1	Geoinformatics I.	4
13.	NGB_ET005_2	Geoinformatics II	3
14.	NGB_ET005_3	Geoinformatics III.	3
15.	NGB_ET006_1	Urban engineering I.	3
16.	NGB_ET006_2	Urban engineering II.	3
17.	NGB_ET007_1	Transport infrastructure I.	3
18.	NGB_ET007_2	Transport infrastructure II.	3
19.	NGB_ET007_3	Transport infrastructure III.	3
20.	NGB_ET007_4	Transport infrastructure IV.	3
21.	NGB_ET008_1	Hydraulic engineering I.	3
22.	NGB_ET008_2	Hydraulic engineering II.	3
23.	NGB_ET008_3	Hydraulic engineering III.	3
24.	NGB_FI004_1	Physics	4
25.	NGB_JE001_1	Basics of law	2
26.	NGB_KM001_1	Technical chemistry	2

Course code		Title	Credits
27.	NGB_KM002_1	Environmental protection	2
28.	NGB_MA002_1	Mathematics I. Analysis	4
29.	NGB_MA002_2	Mathematics II. Linear Algebra	4
30.	NGB_MA002_3	Mathematics III. Math. statistics	4
31.	NGB_NM001_1	European studies	2
32.	NGB_SE001_1	Mechanics I – Statics	5
33.	NGB_SE001_2	Mechanics II. – Analysis of stress and strain	5
34.	NGB_SE001_3	Mechanics III. – Indeterminate structures. Dynamics	5
35.	NGB_SE003_1	Engineering methods I.	4
36.	NGB_SE003_2	Engineering methods II.	4
37.	NGB_SE003_3	Engineering methods III.	4
38.	NGB_SE004_1	Structures I.	3
39.	NGB_SE004_2	Structures II.	3
40.	NGB_SE004_3	Structures III.	3
41.	NGB_SE004_4	Structures IV.	3
42.	NGB_SE004_5	Structures V.	3
43.	NGB_SE005_1	Geotechnics I.	4
44.	NGB_SE005_2	Geotechnics II.	3
45.	NGB_SE005_3	Geotechnics III.	3
46.	NGB_SV001_1	Company economics	4
47.	NGB_SZ003_1	Informatics	4
48.	NGB_SZ004_2	Informatics/Web-technology	4
49.	NGB_SZ004_3	Informatics/Office Program	4
50.	NGB_TS001_1	Physical training I.-IV.	0
Total			**169**

Optional economic and human courses

Course code		Title	Credits
1.	NGB_SE002_1	The civil engineer in the society	2
2.	NGB_TT006_1	History of philosophy	2
3.	NGB_KM003_1	Engineering communication	2
4.	NGB_ET010_1	Strategic planning	2
5.	NGB_TT005_1	Sociology	2
Total			**10**

Specialisation of transport infrastructure

Course code		Title	Credits
1.	NGB_ET009_1	Traffic engineering I.	3
2.	NGB_ET009_2	Traffic engineering II.	3
3.	NGB_ET011_1	Roads I.	3
4.	NGB_ET011_2	Roads II.	3
5.	NGB_ET011_3	Roads III.	3
6.	NGB_ET012_1	Railways I.	3
7.	NGB_ET012_2	Railways II.	3
8.	NGB_ET012_3	Railways III.	3
9.	NGB_ET013_1	Transport construction project I.	3
10.	NGB_ET013_2	Transport construction project II.	3
11.	NGB_KM004_1	Environmental analysis I.	5
12.	NGB_KM004_2	Environmental analysis II.	5
13.	NGB_KO027_1	Public transport	3
14.	NGB_SE005_4	Geotechnics IV.	3
15.	NGB_SE007_1	Bridges I.	3
16.	NGB_SE007_2	Bridges II.	4
Total			**53**

Specialisation of structural engineering

Course code		Title	Credits
1.	NGB_EP004_1	Building constructions I.	4
2.	NGB_EP004_2	Building constructions II.	4
3.	NGB_EV003_1	History of architecture I.	3
4.	NGB_EV003_2	History of architecture II.	3
5.	NGB_KM004_1	Environmental analysis I.	5
6.	NGB_KM004_2	Environmental analysis II.	5
7.	NGB_SE005_4	Geotechnics IV.	3
8.	NGB_SE007_1	Bridges I.	3
9.	NGB_SE007_2	Bridges II.	4
10.	NGB_SE008_1	Construction of structures I.	3
11.	NGB_SE008_2	Construction of structures II.	3
12.	NGB_SE008_3	Construction of structures III.	3
13.	NGB_SE009_1	Construction project I.	3
14.	NGB_SE009_2	Construction project II.	3
15.	NGB_SE010_1	Analysis of structures	4
Total			**53**

Specialisation of municipal engineering

Course code		Title	Credits
1.	NGB_ET009_1	Traffic engineering I.	3
2.	NGB_ET014_1	Communal works I.	3
3.	NGB_ET014_2	Communal works II.	3
4.	NGB_ET015_1	Settlement development project I.	3
5.	NGB_ET015_2	Settlement development project II.	3
6.	NGB_EV002_1	Urban and Landscape Planning I.	3
7.	NGB_EV002_2	Urban and Landscape Planning II.	3
8.	NGB_EV003_1	History of Architecture I.	3
9.	NGB_EV003_2	History of Architecture II.	3
10.	NGB_KM004_1	Environmental analysis I.	5
11.	NGB_KM004_2	Environmental analysis II.	5
12.	NGB_KO027_1	Public transport	3
13.	NGB_RT001_1	Development of settlements and regions I.	3
14.	NGB_RT001_2	Development of settlements and regions II.	3
15.	NGB_RT001_3	Development of settlements and regions III.	3
16.	NGB_RT001_4	Development of rettlements and regions IV.	3
Total			**52**

3.5) Course descriptions

3.5.a) Compulsory courses

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Economics</td></tr>
<tr><td colspan="2">Course code: NGB_AK002_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 1</td></tr>
<tr><td colspan="4">Responsible department: Department of Economics</td></tr>
<tr><td colspan="4">Name of lecturer/s: Péter Farkas</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>4</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>–</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Principle of business behaviour. Society and economy. Definition of business economy. Environment of business behaviour. Institutions of value and income production. General characterisation of business organisations. Company-like business organisations. Outer and inner environment of business activity. Managing outer contacts of companies. Inner environment of companies. System of value and income production. Role of products and services in managing business processes. Production management systems. Market policy, marketing and marketing communication. Innovations and investments. Resource management. Logistics of business facilities. Evaluation of economic activity.</td></tr>
<tr><td colspan="4">Recommended reading:
Bálint Dénes: Egyetemi jegyzet (készülő kézirat), SzE, Győr, 2003.
Simanovszki – Solt –, Bálint: Közgazdaságtan alapfokon, Tri-Mester, Tatabánya 2000</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Descriptive geometry</td></tr>
<tr><td colspan="2">Course code: NGB_EP001_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 1</td></tr>
<tr><td colspan="4">Responsible department: Department of Architecture Building Construction</td></tr>
<tr><td colspan="4">Name of lecturer/s: István Major</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
The subject gets the students acquainted with those projection methods and systems, which will be necessary during their studies and engineering praxis. Goals: skills for proportion, drawing skills, comprehension of drawings, development of spatial eyesight. Parallel and index-numbered projection systems, basic of spatial geometry, construction, attributes of three-dimensional objects. Parallelism, perpendicularity, intersection, fitting, dimensional tasks, rotation in the system of Monge projection. Axonometric projection, general and engineering axis. The basic of index-numbered projection, basic construction, tasks with terrains and slopes.</td></tr>
<tr><td colspan="4">Recommended reading:
Dr. Szente Béla: Műszaki rajz, J 19-364
Hant–Háromi: Ábrázoló geometria feladatlapok
Dr. Szente Béla: Műszaki rajz, J 19-365 Tanulmányi segédlet</td></tr>
</table>

<table>
<tr><td colspan="5">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="5">Course title: Building Materials I.</td></tr>
<tr><td colspan="3">Course code: NGB_EP002_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="3">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="5">Responsible department: Department of Architecture Building Construction</td></tr>
<tr><td colspan="5">Name of lecturer/s: Viktor Molnár, Dr.</td></tr>
<tr><td colspan="5">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="5">Course contents:
The subject beside the knowledge of general gnosis of materials (chemical, physical and mechanical attributes) involves the specific areas of building stones and aggregates, anorganic binding materials (hydraulic and non-hydraulic); (freshly set and consolidated) concretes, building plastics, organic binding materials (resins, bitumen), asphalts, ceramics, glasses, building metals and building wood. In this semester emphasis is laid on the lectures (two hours per week). There is one hour per week which is accessible for the laboratorial exercises: it is executed bi-weekly in two hours.</td></tr>
<tr><td colspan="5">Recommended reading:
Dr. Tóth Zoltán: Építőanyagok I-II
Dr. Balázs György: Építőanyagok és kémia</td></tr>
</table>

<table>
<tr><td colspan="5">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="5">Course title: Building Materials II.</td></tr>
<tr><td colspan="3">Course code: NGB_EP002_2</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="3">Year of study: 2</td><td colspan="2">Semester: 3</td></tr>
<tr><td colspan="5">Responsible department: Department of Architecture Building Construction</td></tr>
<tr><td colspan="5">Name of lecturer/s: Viktor Molnár, Dr.</td></tr>
<tr><td colspan="5">Prerequisites: NGB_EP002_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="5">Course contents:
In the subject of „Building Materials II.” the acquirement of the specific areas of the school-work goes on calculating and experiential level, those are: qualification and amelioration of aggregates, statistics (evaluation of the results of analyses), concrete engineering, strength tests of consolidated concrete (tests with Schmidt-hammer and ultrasonic surveys; and their evaluation), mechanical analyses of building metals and wood, the basic of calculation of asphalt cladding, surveys on asphalts, on plastics, quality management. In this semester the emphasis is divided approximately equally among the lectures, exercises and the laboratory works. There is one hour per week which is accessible for this subject: it is executed bi-weekly in two hours.</td></tr>
<tr><td colspan="5">Recommended reading:
Dr. Tóth Zoltán: Építőanyagok I-II
Dr. Balázs György: Építőanyagok és kémia</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Buildings I.**			
Course code: NGB_EP003_1		ECTS credits: 4	
Year of study: 2		Semester: 3	
Responsible department: Department of Architecture Building Construction			
Name of lecturer/s: György Fátrai, Dr.			
Prerequisites: –			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	2	
	Assignments	2	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
The function and importance of building construction in the building action of civil engineers. The domain of building construction and its assignment. The basic knowledge of constructional systems: choice of materials and constructions of supporting systems, principles of constructions. Definitions concerning with load-bearing (and with some space divider) constructions. The basic principles of construction and the aspects of choice of foundations, walls, slabs, frame constructions, roof framings, roofing and stairs. Chimneys, ventilating shafts. Ring beams, lintels. The main alternatives of openings. The basic principles of water proofing. Types of claddings.

Recommended reading:
Dr. Gábor László: Épületszerkezettan I-IV. Tankönyvkiadó, Budapest.
Dr. Koppány Attila: Épületszerkezettan I-II. jegyzet, Novadat Kiadó, Győr, 1994.

BSc in Civil engineering – Course description			
Course title: **Buildings II.**			
Course code: NGB_EP003_2		ECTS credits: 4	
Year of study: 2		Semester: 4	
Responsible department: Department of Architecture Building Construction			
Name of lecturer/s: György Fátrai, Dr.			
Prerequisites: NGB_EP003_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	2	
	Assignments	2	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
Demands of foundations. The aspects of choice of foundation system. Shallow foundations. The main alternatives of spread and pad footings. Beam and beam-grid footings. Deep foundations. Pier and well foundations. Cabine and slurry wall foundation. Load bearing walls. Choice in materials and fabrics. Walls made of masonry unit. Masonry units. Moulded walls. Cast-in-place walls. Precast walls. Block walls, panels, lightweight walls. Alternatives of partitions. Finishing and claddings on walls. Stairs. Principles of designing. Variations by plan view and by construction.

Recommended reading:
Dr. Széll László: Magasépítéstan I-II. Tankönyvkiadó, Budapest
Dr. Petró Bálint: az épületszerkezettan és az épületszerkezetek tervezése. ÉTK, Budapest. 1991.
Martin Mittag: Épületszerkezettan. Dialóg Campus Kiadó, Pécs, Budapest

BSc in Civil engineering – Course description			
Course title: **Buildings III.**			
Course code: NGB_EP003_3		ECTS credits: 3	
Year of study: 3		Semester: 5	
Responsible department: Department of Architecture Building Construction			
Name of lecturer/s: György Fátrai, Dr.			
Prerequisites: NGB_EP002_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	2	
	Assignments	2	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
The third semester of the subject (Building Design) contains the basics of building design. Through the lectures the students get acquainted with the concepts of architecture, the fundamental features of designing process, the correspondences of building-construction-volume and the essential prescriptions and building acts. Beside the lectures the disposal of exercises (from the compositional tasks of the moderate level to the small-sized, perspicuous engineering tasks) helps the cognition of the methodology and the logic of building planning.

Recommended reading:
Dr. Reischl Antal: Lakóépületek tervezése. Tankönyvkiadó, Budapest. 1983.
Gádoros lajos: Középületek tervezése. Tankönyvkiadó, Budapest. 1981.
Ernst Neufert: Építés- és tervezéstan. Dialóg Campus kiadó, Pécs, Budapest. 1998.

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Computer graphics</td></tr>
<tr><td colspan="2">Course code: NGB_ET001_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 3</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Péter Kovács</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SZ003_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Information society, importance of information and information technology, elements of computer systems. Working principle of computers. Neumann’s principle, recent technologies, characteristics of hardware (independent computer systems, networks), software (operation systems, graphic surfaces, network protocols etc.), role of word wide networks, search algorithms, communication, mobile and electronic message delivery, on-line applications, portal design, development and management of informatic systems, safety of informatic systems, application groups: integrated business systems, branch informatic systems, technical design systems, other software supports, role and possibilities of multimedia.</td></tr>
<tr><td colspan="4">Recommended reading:
Pintér Miklós: Számítógéppel segített rajzolás, 2000
Dr. Varga Tibor: AUTOCAD 2000 és Release 14 kezdőknek, haladóknak</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Quality Management</td></tr>
<tr><td colspan="2">Course code: NGB_ET003_1</td><td colspan="2">ECTS credits:</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Mária Petőcz, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Importance of quality, development of quality, overview of approaches and changes in the organisational solutions. Meanings of quality, quality levels. Elements associated with quality, importance of standardisation, standard types. Quality management systems based on ISO-standards. Contents of standards, definition and application of standard requirements. Practical satisfying of some standard requirements in case studies. Rules and practice of audit, system construction and operation. Connecting and sister systems: environment-conscious steering, overview of ISO-based and other quality management systems.</td></tr>
<tr><td colspan="4">Recommended reading:
Petőcz–Szabó: Minőségirányítás – Minőségmenedzsment
PMS, Budapest, 2003
Bálint Julianna: Minőség – Tanuljuk és tanítsuk.
Műszaki Könyvkiadó, Budapest, 2003.</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Construction management I.</td></tr>
<tr><td colspan="2">Course code: NGB_ET004_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Ferenc Kiss, Dr., Jenő Bizzer</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE003_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>2</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Preparation of constructions, competitive bidding. Construction organisation: timing, spatial organisation. Cost calculation, additional cost factors, construction budget. Contracting and legal issues. Process of construction management. Implementation, documents of taking-over. Factors influencing quality and economic efficiency.</td></tr>
<tr><td colspan="4">Recommended reading:
Tanácsadó Mérnökök Magyarországi Szövetsége (TMSz) kiadványai. (eredetileg FIDIC kiadványok)
Dr. Takács László: Építésszervezés (Távoktatási kézirat 1996)</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Construction management II.</td></tr>
<tr><td colspan="2">Course code: NGB_ET004_2</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Ferenc Kiss, Dr., Jenő Bizzer</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET004_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>2</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Competitive bidding after joining the EU, international competitive bidding. Concession tendering. Financing construction projects. Competitive edges and handicaps, risks. Steering tasks of the management during the project implementation. Organisation plans, business plan. Computer aided construction organisation. Setting up quality management system in construction enterprises.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
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<table>
<tr><td colspan="5">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="5">Course title: Geoinformatics I.</td></tr>
<tr><td colspan="2">Course code: NGB_ET005_1</td><td colspan="3">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="3">Semester: 2</td></tr>
<tr><td colspan="5">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="5">Name of lecturer/s: Rudolf Ottófi, Dr., András Tóvári, Tóváriné Magdolna Zotter, István Gyulai</td></tr>
<tr><td colspan="5">Prerequisites: NGB_MA002_ and NGB_EP001_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>1</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>3</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="5">Course contents:
Global geodesic knowledge, networks, error-theoretic elements. Traditional, horizontal and vertical networks, combined networks used for new positioning techniques. Essential geodesic calculations. Horizontal measuring, measuring instruments, methods: measuring exercises and theoretical issues. Vertical measuring, measuring instruments, methods: levelling, tachymetric measuring instruments. Electronic tachymetry. Electronic measuring instruments as geoinformatic input data providers. Recent methods of electronic angle and distance measurement, instruments of data input and transfer. Global positioning in geoinformatics.</td></tr>
<tr><td colspan="5">Recommended reading:
Dr. Ottófi Rudolf: Geodézia UNIVERSITAS–Győr Kht. 1999.
Dr. László Sándor–Dr. Ottófi Rudolf: Geodézia Mérési és Számításai gyakorlatok</td></tr>
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<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Geoinformatics II.</td></tr>
<tr><td colspan="2">Course code: NGB_ET005_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 3</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Rudolf Ottófi, Dr., András Tóvári, Tóváriné Magdolna Zotter</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET005_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>1</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Error theory of horizontal and vertical measurements, managing errors. Geodesic activities associated with urban planning. Setting out. Architectural surveys (castles, other monuments). Industrial exercises. Continuing electronic measuring methods.</td></tr>
<tr><td colspan="4">Recommended reading:
Dr. Ottófi Rudolf: Geodézia UNIVERSITAS–Győr Kht. 1999.
Dr. László Sándor: Geodézia II. Nemzeti Tankönyvkiadó
Dr. László Sándor–Dr. Ottófi Rudolf: Geodézia Mérési és Számításai gyakorlatok</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Geoinformatics III.</td></tr>
<tr><td colspan="2">Course code: NGB_ET005_3</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 4</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Rudolf Ottófi, Dr., András Tóvári</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SZ003_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>1</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Data in recent database concept are alphanumeric ones. These data can represent points, lines or areas (house number, perimeter etc.) above ground. 3D visualisation possibilities of graphic surfaces. GIS (Geographical Information System) is a tool of geoinformatics, with which information can be derived from the database containing geographically localisable data. Data can be visualised graphically or/and in text.</td></tr>
<tr><td colspan="4">Recommended reading:
Dr. Ottófi Rudolf – Tóvári András: Térinformatika
UNIVERSITAS–Győr Kht. 1999.
Sárközi: Térinformatika</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Urban Engineering I.</td></tr>
<tr><td colspan="2">Course code: NGB_ET006_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 4</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Csaba Koren, Dr., Emese Makó, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>3</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>50</td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td>50</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Characteristics of settlements, concentration processes of settlements (causes, quantitative characterisation). Functions, density of infrastructure networks. Interrelations of infrastructure networks and settlement networks. Traffic volume distribution on road networks. Urban sprawl (grid, directions, limits). Land use patterns. Interrelations of land use and traffic (intensity, function, location, traffic, parking). Definition and regulation of building indices. Contents of master plans. Traffic facilities and public utilities of settlements. Infrastructure development dilemmas (branch-area, compromise-compensation, national-regional-local, public-private). Contents of settlement development plans. Environmental impacts of facilities. Definition of sustainable settlement and traffic development.</td></tr>
<tr><td colspan="4">Recommended reading:
Tóth Zoltán: Települések világa. Ponte Press. Pécs 2000.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Urban Engineering II.</td></tr>
<tr><td colspan="2">Course code: NGB_ET006_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 5</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Iván Németh, Dr., Emese Makó, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>7</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Lectures: interdisciplinary of urban planning; sharing the work among the settlements; stages of settlement development; areal co-operations; settlement grid: humane and technical infrastructures, built up conditions, operation, impacts; settlement plan types: development and master plans; protection of settlement environment.
Seminar: supply functions of settlements, gathering and processing demographic data; identification of existing land use and road network; evaluation of public transport network; identification of existing built in conditions and intensity; SWOT analysis, literature survey via internet and elaboration.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Transport Infrastructure I.**			
Course code: NGB_ET007_1		ECTS credits: 3	
Year of study: 2		Semester: 4	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Ferenc Horvát, Dr., István Hausel			
Prerequisites: NGB_EP003_1 and NGB_MA002_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
Hungarian road and rail network, international aspects. Road and rail classification. Road and rail vehicle dynamics (road and rail resistances, pull force types). Characteristics of rail bound traffic (width of track, loading gauge, clearance, movement in curves, adhesion). Acceleration and forces affecting road/rail vehicles in curves. Superelevation of road/rail (cause and effect, height of superelevation, superelevation ramp, design rules). Transition curves used in road/rail design. Calculation and setting out of pure and symmetric transition curve points. Rail basket curves and inflexion reverse curves. Road/rail cross-sections. Horizontal and vertical alignment of roads/rails, harmonisation. Design of road/rail grade-crossings. Road traffic issues (average daily traffic, design hourly traffic volume). Stopping and overtaking sight distance. Classification of road junctions, grade-crossings, grade separated junctions. Bicycle tracks. Materials of road pavement structure. Asphalt, concrete and stone pavements.

Recommended reading:
Major I. – Tóth G.: Út-, vasútépítés (J 19-620)
Gajári J.: Vasútépítés I. Tankönyvkiadó, Budapest, 1983

BSc in Civil engineering – Course description			
Course title: **Transport Infrastructure II.**			
Course code: NGB_ET007_2		ECTS credits: 3	
Year of study: 3		Semester: 5	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Kálmán Adorjányi, Dr., Gábor Tóth			
Prerequisites: NGB_ET005_2 and NGB_ET007_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
Classification of roads, road network elements. The European road network. Determination of traffic parameters. Interrelations of road vehicle dynamics and design parameters. Layout of road cross-sections. Road clearance, cross-section patterns. Horizontal alignment of roads. Curves, sight distances. Vertical alignment of roads. Harmonisation of horizontal and vertical alignment. Spatial alignment, aesthetics of roads. Design of drainage system. Identification of proprietary and user costs. Cost-benefit analyses. Environmental design of roads. Design of environmental facilities. Design of urban roads. Public utilities. Pavements and bicycle tracks. Traffic-calming. Design of local roads. Design problems of by-passes. Layout of road junctions. Grade-crossings, grade separated junctions. Design of roadside facilities.

Recommended reading:
Nemesdy E. Úttervezés. 44474/1, Tankönyvkiadó, Budapest,
Fi István. Utak és környezetük tervezése, Műegyetemi kiadó, Budapest, 2000.
Dr. Krizsán–Dr. Koren: Úttervezés és forgalomtechnika I-II. J19-559/J19-574

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Transport Infrastructure III.</td></tr>
<tr><td colspan="2">Course code: NGB_ET007_3</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 5</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Ferenc Horvát, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET005_2 and NGB_ET007_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Development of rail track superstructure, track systems, loading power types affecting the track. The rail. Sleepers of the track and turn outs. Rail fastening systems. Rail joints mounted with fish plates. Rail welding. Crashed stone ballast. Protection layers. Superstructure of level crossings. Ballastless superstructure. Dilatation of the railway track. Continuous welded rails (CWR). Safety of the railway tracks against buckling. Rail fracture in winter times and their repair.</td></tr>
<tr><td colspan="4">Recommended reading:
Gajári J.: Vasútépítés I. Tankönyvkiadó, Budapest, 1983
Korszerű vasút, korszerű vasúttechnika. Vasútépítés és pályafenntartás I. és II., MÁV Zrt., 1999</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Transport Infrastructure IV.</td></tr>
<tr><td colspan="2">Course code: NGB_ET007_4</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Csaba Koren, Dr., Zsuzsanna Tóth–Szabó Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_MA003_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>2</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>50</td><td>%</td></tr>
<tr><td>Assignments</td><td>50</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Approaches and process of transportation planning. Transport demand. Characteristics of mobility and its determinants. Transport supply. Characteristics of networks. Balance of demand and supply. Mobility management. Calculation and evaluation of delays. Traffic safety and its evaluation. Prognoses, scenarios. Classification of interventions, examples. Traffic calming. Parking. Designing for bicycle traffic. Modal share of public and private transport. Evaluation methods of road projects. Social acceptance, consultation.
The assignments are related to bicycle traffic and parking studies.</td></tr>
<tr><td colspan="4">Recommended reading:
Dr. Koren Csaba: Közlekedéstervezés. PMS, 1998.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Hydraulic Engineering I.**			
Course code: NGB_ET008_1		ECTS credits: 3	
Year of study: 2		Semester: 4	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Ferenc Petróczky, Edina Koch			
Prerequisites: NGB_MA002_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	2	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%
Course contents: Overview of basic characteristics of water. Hydro meteorological phenomena. Elements of hydrological cycle (rainfall, evaporation etc.) and their examination. Water flows, classification of water systems, characterisation of water movements in courses. Deposit movements, course evolution. Dead-waters. Subsurface waters. Hydrological measurements. Examinations of hydrological data rows and their characteristics. Hydrological definition of water supply management. Water demand, water use, water balance. Ideology of water supply management, its role in natural resource management (quantity, quality). Tasks and sub-branches of water supply management. History and recent policies of water supply management. Water administration. Water supply policy. Water collector management design. Effect of human intervention on natural water balance. Water quality protection.			
Recommended reading: Petróczky F.: Hidrológia SZIF, Győr, 2002. Petróczky F.: Hidraulika (elektronikus jegyzet) SZE, Győr, 2006. Víz-keretirányelv 2000/60/EK			

BSc in Civil engineering – Course description			
Course title: **Hydraulic Engineering II.**			
Course code: NGB_ET008_2		ECTS credits: 3	
Year of study: 3		Semester: 5	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Ferenc Petróczky, Edina Koch			
Prerequisites: NGB_MA002_2 and NGB_FI004_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	2	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
Physical characteristics of water. Basic equation of hydrostatics and its application. Determination of water pressures. Types of liquid movements, principle of continuity. Euler's law. Bernoulli's law and its practices. Speed distribution and energy losses. Channel dimensioning, surface curves. Water movement in pipeline, pipeline dimensioning. Dimensioning of water engineering structures. Hydraulics of leakage. Numeric methods in hydraulics. Application of hydraulic programs. Branches of practical water supply management. Hydraulic engineering tasks. River and lake regulations, river management. Flood control. Water management in highlands. Stream regulation. Water management in flatlands: excess water control, inland water drainage. Artificial lakes. Water power utilisation. Water barrages. Water routes and their facilities.

Recommended reading:
Petróczky F.: Vízépítés SZIF–UNIVERSITAS Kft. Győr, 2001

BSc in Civil engineering – Course description			
Course title: **Hydraulic Engineering III.**			
Course code: NGB_ET008_3		ECTS credits: 3	
Year of study: 3		Semester: 6	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Ferenc Petróczky, Katalin Bolla			
Prerequisites: NGB_MA002_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	3	Pieces
Assessment method	Oral exam	–	%
	Written exam	50	%
	Assignments	50	%

Course contents:
Public utility types and systems. Public utility demands and their satisfaction. Possible location of public utilities. Water supply system and its technical equipment. Water gaining, water treatment, operation. Sewage and placement, engineering structures. Sewage treatment. Other public utilities and their equipment: gas supply, heat supply, electric and information cables, special services. General methods of public utility construction. Overview of public utility construction. Pipe laying in open ditch. Public utility construction without excavation. Public utility tunnels. Operational issues of public utilities. Protection, repair and renewal of public utilities. Administration and approval issues of public utilities.

Recommended reading:
Petróczky F.: Közműépítés UNIVERSITAS−Győr KHT, Győr, 2004.

BSc in Civil engineering – Course description			
Course title: **Physics**			
Course code: NGB_FI004_1		ECTS credits: 4	
Year of study: 1		Semester: 2	
Responsible department: Department of Physics and Chemistry			
Name of lecturer/s: András Horváth, Dr.			
Prerequisites: NGB_MA002_1			
Teaching method	Lectures	3	Hours
	Seminars / Laboratory works	1	
	Assignments	–	Pieces
Assessment method	Oral exam	–	%
	Written exam	100	%
	Assignments	–	%

Course contents:
Basic concepts of classical Physics. Dynamics of mass points. Oscillation (harmonic- damped- and driven oscillations, compound oscillations) Basic concepts of waves (linear, planar and volume waves, interference, standing waves, Huygens-Fresnel principle). Acoustics (intensity, physics of wave propagation, damping in continuous medium and layers.) Optics (wave optics, diffraction in gaps and grids, geometrical optics, lenses, mirrors and telescopes). Heat conduction (Fick law, stationary heat conduction, Newton's law of body cooling, simple, non-stationary problems). Heat radiation (Stefan-Bolzmann law, radiative cooling and heating of bodies). Principles of atomic and nuclear physics (structure of atoms, radioactivity, and nuclear energy production). Physics of molecules and solid bodies (primary and secondary bounds, structure of energy levels). Principles and applications of lasers.

Recommended reading:
Berta Miklós, Horváth András: Fejezetek a fizikából (Novadat, 1994)
Berta Miklós, Horváth András, Tolnai László: Újabb fejezetek a fizikából (Novadat, 1995)

BSc in Civil engineering – Course description			
Course title: **Basics of law**			
Course code: NGB_JE002_1		ECTS credits: 2	
Year of study: 1		Semester: 1	
Responsible department: Department of Legal Theory			
Name of lecturer/s: Péter Smuk, Dr.			
Prerequisites: –			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	–	
	Assignments	–	Pieces
Assessment method	Oral exam	–	%
	Written exam	100	%
	Assignments	–	%
Course contents: Students get acquainted with the Hungarian legal system. They get an insight view of public law, they study the structure of Hungarian state institutions (Parliament, Government, Constitution court etc.). In the other half of the semester the students study the Hungarian civil law and its institutions.			
Recommended reading: Halmai G.–Szalay L.: Jogi ismeretek I., Rejtjel Kiadó, Budapest, 2000, Lenkovics B.: Jogi ismeretek II., Rejtjel Kiadó, Budapest, 2000			

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Technical chemistry</td></tr>
<tr><td colspan="2">Course code: NGB_KM001_1</td><td colspan="2">ECTS credits: 2</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 1</td></tr>
<tr><td colspan="4">Responsible department: Department of Physics and Chemistry</td></tr>
<tr><td colspan="4">Name of lecturer/s: Lesny Juraj, Dr., Gábor Simon, Dénes Szalay</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>–</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Chemical fundamentals, atomic structure, bindings. Conditions. Solution coherence, calculation of concentration. Stochiometrics fundamentals, calculations, thermochemicals elements. Fundaments of reaction kinetic, balances. Acid-basis theoretics, pH, calculation of pH. Fundaments of inorganic chemistry, relevant elements and their combination. Fundaments of organic chemistry, review of carbo-hydrates, their relevant reactions. Review of organic combinations with oxygen and nitrogen content. Carbo-hydrates, aminoacids, proteins, nucleic acids.</td></tr>
<tr><td colspan="4">Recommended reading:
Lesny – Simon – Végh: Általános kémia, Universitas–Győr, 2002.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Environmental protection**			
Course code: NGB_KM002_1		ECTS credits: 2	
Year of study: 1		Semester: 1	
Responsible department: Department of Environmental Engineering			
Name of lecturer/s: Zoltán Szalay, Dr.			
Prerequisites: –			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	–	
	Assignments	–	Pieces
Assessment method	Oral exam	–	%
	Written exam	100	%
	Assignments	–	%

Course contents:
General introduction of the problems of environmental protection, principles, determinant procedures, goals. Ecological fundamentals of environmental protection. Review of environmental elements, characteristics of environmental status of our country. Aim of nature conservation, its causes and necessity. Relationship between environmental protection and nature conservation, landscape protection. Waste management, principles, goals, priorities, waste prevention, waste reduction. Electricity supply of the world, global problems, environmental questions. Features of renewing resources, international and national potentialities. Noise, vibration and radiation protection. Justification and necessity of the environmental regulation. Goals, tools and possibilities of the regulation. Definition of sustainable development, connection between the economical growth and sustainability.

Recommended reading:
Kerényi A.: Általános környezetvédelem. Szeged, 1995,
Mozaik Oktatási Stúdió
Moser M., Pálmai Gy.: A környezetvédelem alapjai. Budapest, 1992,
Tankönyvkiadó
Környezetvédelem. szerk: Bulla Miklós. SZE, Győr, 2006. május 12.

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Mathematics I. Analysis</td></tr>
<tr><td colspan="2">Course code: NGB_MA002_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 1</td></tr>
<tr><td colspan="4">Responsible department: Department of Mathematics and Computer Sciences</td></tr>
<tr><td colspan="4">Name of lecturer/s: Antal Lukács</td></tr>
<tr><td colspan="4">Prerequisites:</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
– Basic definitions of functions (domain of definition, range, inverse, graph).
– Further definitions (monotonicity, boundedness, local and global extrema).
– Elementary functions and their properties (power, exponential, trigonometrical functions).
– Sequences and series (monotonicity, boundedness, limit; tests of convergence).
– Limit and continuity of real functions.
– Differential quotient and its geometrical meaning.
– Application of differentiation: tangent lines, approximation of functions, analysis of functions with respect to monotonicity, convexity.
– Applications to real life and engineering problems: finding extremal values.
– Taylor polynomials and series.
– Integration: motivation, definitions.
– Methods of integration Newton-Leibniz rule.
– Approximate integration.
– Applications: area, volume, surface, arc length calculation.</td></tr>
<tr><td colspan="4">Recommended reading:
Ács László, Gáspár Csaba: Analízis 1. Elektronikus jegyzet.
Széchenyi István Egyetem, 2004.
Császár Ákos: Valós analízis I. Nemzeti Tankönyvkiadó, 1999.
Kovács József, Takács Gábor, Takács Miklós: Analízis.
Nemzeti Tankönyvkiadó, 2001.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Mathematics II. Linear Algebra</td></tr>
<tr><td colspan="2">Course code: NGB_MA002_2</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Mathematics and Computer Sciences</td></tr>
<tr><td colspan="4">Name of lecturer/s: Béláné Molnár</td></tr>
<tr><td colspan="4">Prerequisites: NGB_MA002_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
– Geometrical vectors in plane and space. Operations and their properties. Basis and coordinates. Computation of vector operations using coordinates. Applications: area, volume, distance, angle computations.
– Linear vector spaces: generalizations of geometrical vectors. Base, generator and independent systems of vectors. Rank. Dimension.
– Matrices, tensors: operations; Eigen values and eigenvectors. Definite matrices.
– Basic definitions of functions with several real variables (scalar-vector, vector-scalar, vector-vector functions). Graphs. Elementary functions and their graphs.
– Partial differentiation: gradient, divergence and curl operators, Jacobean, Hessian.
– Application of differentiation: the role of the gradient direction, function approximation, extremal values.
– Integration of scalar-vector functions.</td></tr>
<tr><td colspan="4">Recommended reading:
Scharnitzky Viktor: Vektorgeometria és lineáris algebra.
Nemzeti Tankönyvkiadó Rt., 1999.
Leindler László: Analízis (jegyzet). Polygon, 2001.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Mathematics III. Mathematical statistics</td></tr>
<tr><td colspan="2">Course code: NGB_MA002_3</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 3</td></tr>
<tr><td colspan="4">Responsible department: Department of Mathematics and Computer Sciences</td></tr>
<tr><td colspan="4">Name of lecturer/s: Krisztina Szalay</td></tr>
<tr><td colspan="4">Prerequisites: NGB_MA002_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
– Motivations. Basic definitions (event, probability). Properties and basic theorems of probability. Classical and geometrical computation of probability. Combinatorics.
– Conditional probability, independent events. Further theorems (Bayes).
– Random variables and their characterization: mean, deviation, distribution and density function. Independent variables.
– Special random variables and their appearance in practice (binomial, Poisson, normal, exponential).
– Motivations of statistics.
– Samples, data display, histograms. Summary statistics.
– Confidence intervals.
– Tests (u, t, chi squared, non-parametric).
– Correlation and regression (single and multiple linear regression).</td></tr>
<tr><td colspan="4">Recommended reading:
Reimann József, Tóth Julianna: Valószínűségszámítás és matematikai statisztika. Nemzeti Tankönyvkiadó Rt., 2000.
Denkinger Géza: Valószínűségszámítás, Tankönyvkiadó, Budapest, 1990.
Denkinger Géza: Valószínűségszámítási gyakorlatok
Nemzeti Tankönyvkiadó Rt., 2003.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **European studies**			
Course code: NGB_NM001_1		ECTS credits: 4	
Year of study: 2		Semester: 3	
Responsible department: Department of Private and Public International Law			
Name of lecturer/s: György Márk Ponácz			
Prerequisites: NGB_JE002_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	–	
	Assignments	–	Pieces
Assessment method	Oral exam	–	%
	Written exam	100	%
	Assignments	–	%

Course contents:
Geographical, culture-historical, ethnical boundaries of Europe. Nation and state in Europe. Characteristics of state development in the XIX. century. Causes for Europe's economic and political ground loss at the beginning of the XX. Century. Thoughts of the possible ways of European co-operation between the two world wars. Europe's place and role in the bipolar world. Causes for the insuccess of Big-Europe concept. Schuman plan: European Coal and Steel Community. Major objectives of the Treaty of Rome. Successes and insuccesses of political and economic co-operations in the 60's (EFTA, de Gaulle etc.) Increasing economic difficulties at the beginning of the 70's (Bretton-Woods, oil crisis). Integration initiatives of the 80's (English quota, EEA – European Economic Area, Delors-plan). Treaties of Maastricht. Responses of the EU to the Central-European changes of the 90's (co-operation, expansion, constitution issues). Experiences of EU expansions with special attention to the eastern expansions.

Recommended reading:
Európai integrációs alapismeretek. Szerk.: Blahó András. Aula Kiadó, 2002. II. fejezet ill. az egyéb fejezetek történeti vonatkozásai.

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Mechanics I – Statics</td></tr>
<tr><td colspan="2">Course code: NGB_SE001_1</td><td colspan="2">ECTS credits: 5</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 1</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: László Lublóy, Dr., Gyula Agárdy</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Forces, force systems, substitution and balance problems. Reactions on simple structures. Reactions and connecting forces in compound structures. Solution methods of trusses. Trusses loaded on bar elements. Internal forces in cross sections. Diagrams of internal forces on straight-, broken-lined and complex frameworks. Internal force distributions under moving loads. Maximum internal force diagrams. Spatial forces, structures.</td></tr>
<tr><td colspan="4">Recommended reading:
Agárdy Gy.–Lublóy L.: Mechanika I., elektronikus jegyzet, 2006.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Mechanics II. – Analysis of stress and strain</td></tr>
<tr><td colspan="2">Course code: NGB_SE001_2</td><td colspan="2">ECTS credits: 5</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: László Lublóy, Dr., Gyula Agárdy</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE001_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Characteristic properties of areas: centroid, first and second moments (inertial moments). Definition of the stress. Stress state, stress tensor. Principal stresses and axes. Cross-sectional stresses caused by simple loads: tension, compression, shear, bending, torsion. Definition of the strains. Strain state in a point, strain tensor. Principal strains. Constitutive equations, linearly elastic and materials. Elastic and plastic bearing capacity. Cross-sectional stresses caused by compound loads: biaxial bending, eccentric normal force, shear and bending. Linear theory of small displacements. Work and energy theorems. Deformation of frameworks.</td></tr>
<tr><td colspan="4">Recommended reading:
Agárdy Gy.–Lublóy L.: Mechanika II., elektronikus jegyzet, 2006.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Mechanics III. – Indeterminate structures. Dynamics**			
Course code: NGB_SE001_3		ECTS credits: 5	
Year of study: 2		Semester: 3	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: László Lublóy, Dr., Gyula Agárdy			
Prerequisites: NGB_SE001_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	2	
	Assignments	–	Pieces
Assessment method	Oral exam	–	%
	Written exam	100	%
	Assignments	–	%

Course contents:
Statically indeterminate structures. Concepts and methods of the solution. Force (flexibility) and displacement (stiffness) method. Application of the moment distribution (Cross) method for the solution of low-degree-of freedom structures with fixed and displaced nodes. Stability phenomena of bars and frameworks, Buckling of bars. Friction, the friction cone. Kinematics of particles. Kinetics of particles. The energy of particles. Kinematics and kinetics of rigid bodies. Single-degree-of-freedom undamped and damped vibration. Free and forced vibration of single-degree-of-freedom systems. Earthquake phenomena. Properties of earthquake effects to the structures. Dinamic properties of structures. Damages on steel frameworks and reinforced concrete buildings. Designing principles and construction rules for earthquake resistant buildings.

Recommended reading:
Agárdy Gy.–Lublóy L.: Mechanika III., elektronikus jegyzet, 2006.

BSc in Civil engineering – Course description			
Course title: **Engineering methods I.**			
Course code: NGB_SE003_1		ECTS credits: 4	
Year of study: 2		Semester: 3	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: Péter Scharle, Dr.			
Prerequisites:			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	3	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
Aims, goals, content and order of the planning, design and construction. Institutional, legal and administrative environment of planning. Dimensions and requirements of designing. Functional and formal design of the engineering projects. Structural design. Safety, risk, responsibility. Creation of decision alternatives. Investigation of environmental impact, cost-benefit analysis. Feasibility, implementation. Decision preparation, reconciliation and conflict management in the design. Information technology applied in the engineering planning. Corporate responsibility and ethics. Role of the designers chambers. Trends of technology development.

Recommended reading:
Kollár L. (szerk): Mérnöki tervezés (jegyzet), 2003
Babcock, D.L., Morse, L.C.: Managing engineering and technology, Prentice Hall, 2002

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Engineering methods II.</td></tr>
<tr><td colspan="2">Course code: NGB_SE003_2</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 4</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Ferenc Kiss, Dr., Edina Koch</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>80</td><td>%</td></tr>
<tr><td>Assignments</td><td>20</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Concept, conditions, preparation, main steps and participants of the building process. Organization principles and skills. Main technologies, machines and controlling of demolition, excavation, deposit and disposition of materials, transportation, mixing technologies, compaction etc. Basic methods of building: precast and monolithic concrete technologies. Steel, timber and lightweight structures, building phases of lengthy constructions (roads, dykes). Quality assurance of the construction, labour safety. Take-over of constructions, technical and administrational procedures of putting into use.</td></tr>
<tr><td colspan="4">Recommended reading:
Dr. Palotás László: Mérnöki kézikönyv IV. kötet vonatkozó fejezetei
Dr. Nagy Pál: Építéstechnológia I. (Alaptechnológiák) Tk. Bp. 1991.
Dr. Soós László: Építőipari gépek I.-II. (földmunkák, alapozási munkák, betonozás, szállítás…) Műegyetemi Kiadó 1993.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Engineering methods III.</td></tr>
<tr><td colspan="2">Course code: NGB_SE003_3</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 5</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Ferenc Horvát, Dr., László Gáspár Dr.</td></tr>
<tr><td colspan="4">Prerequisites:</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>80</td><td>%</td></tr>
<tr><td>Assignments</td><td>20</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Maintenance of engineering structures, its constructional and economic significance. Characteristic data describing the technical state and their measurement. Change of state, parameters of its description. Ageing, degradation and failure processes. Observation and control of buildings and structures. Decision making methods and procedures of intervention. Maintenance strategies. Features of road, railway and bridge maintenance.</td></tr>
<tr><td colspan="4">Recommended reading:
Gáspár L – Horvát F.: Fenntartási módszerek (kézirat, Győr, 2000)</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Structures I.**			
Course code: NGB_SE004_1		ECTS credits: 3	
Year of study: 2		Semester: 3	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: Zoltán Tóth, Dr., János Guzmics			
Prerequisites: NGB_SE001_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam	80	%
	Assignments	20	%

Course contents:
Basic design concepts of reinforced concrete (RC) structures. Fields of application, determination of loads. Constitutive models of concrete and steel. Concepts and rules of reinforcement spacing. Construction rules. Behaviour of RC beams under static loads, characteristic stress states. Principles and concepts of RC standardization – Eurocodes. Dimensioning and checking of rectangular and T sections in I., II. and III. stress states. Design of reinforcement for shear forces. Limit bending moment and shear force distributions. Design, checking and reinforcement spacing of centrically and eccentrically loaded elements. Stiffness and deformation of RC elements. Limitation of crack-width.

Recommended reading:
dr Tóth Zoltán: Tartószerkezetek (Vasbeton szilárdságtan).
Főiskolai jegyzet. NOVADAT Bt 1996.

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Structures II.</td></tr>
<tr><td colspan="2">Course code: NGB_SE004_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 4</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Csaba Kegyes, Dr., György Lőrincz, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE004_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>80</td><td>%</td></tr>
<tr><td>Assignments</td><td>20</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
RC structural elements: slabs, beams, cantilevers, columns, stairs and foundations. Geometric forms, internal forces and design of structural elements. Construction rules of reinforcing in RC elements, nodes and joints. Relationship between construction rules and satisfaction of load bearing capacity, durability and crack-limitation requirements. Reinforcement for torsion. Types of cracks. Loads, mechanical models and structural analysis of RC framed buildings and industrial halls. Structural systems of framed buildings and industrial halls. Basic concepts of stressed RC structures. Stressing technologies, stress relaxation. Characteristic features of stressed cross sections.</td></tr>
<tr><td colspan="4">Recommended reading:
Kollár László: Vasbeton szerkezetek I. Műegyetemi kiadó Budapest, 1995.
BME: Vasbeton szerkezetek. Segédlet. Budapest 2003.
Szalai Kálmán, Farkas György: Betonszerkezetek méretezése az EUROCODE szerint. Tervezési segédlet. Budapest, 2000.
Szalai Kálmán: Vasbeton szerkezetek. Műegyetemi kiadó, 1995, Budapest.
Kegyes Csaba: Vasbeton szerkezetek. Útmutató: tervezés, szerkesztés. 2005.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Structures III.**			
Course code: NGB_SE004_3		ECTS credits: 3	
Year of study: 2		Semester: 4	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: László Lublóy, Dr., György Németh, Dr.			
Prerequisites: NGB_SE001_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam	80	%
	Assignments	20	%
Course contents: Basic design concepts of steel structures. Determination of loads. Material properties of structural steel. Quality classes and assortment of steel construction elements. Design of concentrically and eccentrically tensioned steel members. Design and construction of bent and sheared girders. Strength limit, local and global stability, brittle fracture, fatigue, strains and deformations. Torsion of steel cross-sections. Design of members with solid and complex cross sections under centrical and eccentrical axial loads. Analysis, classification and modelling of joints. Design of connections made with bolts or rivets. Welding technologies. Design of welded connections.			
Recommended reading: dr. Németh György: Tartószerkezetek III. Acélszerkezetek, elektronikus jegyzet 2006. Molnár I. – Szücs S. – dr. Szabó L-né: Tartószerkezetek II. Fa- és acélszerkezetek J 15-554 dr. Ijjas Gy. –dr. Szabó L-né: Tartószerkezetek példatár II. Fa- és acélszerkezetek, főiskolai jegyzet			

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Structures IV.</td></tr>
<tr><td colspan="2">Course code: NGB_SE004_4</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 5</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: László Lublóy, Dr., György Németh, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE004_3</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>80</td><td>%</td></tr>
<tr><td>Assignments</td><td>20</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Application areas and possibilities, advantages and disadvantages of steel structures. Design of different steel structural elements. Types, structural features, spatial stiffening and structural analysis of steel halls. Calculation of internal forces and design of structural elements of steel halls. Types of crane supporting structures. Types of multi-storey framed steel structures. Stresses in steel-concrete composite members. Shear connections. Practical work: design of a lattice girder.</td></tr>
<tr><td colspan="4">Recommended reading:
dr. Csellár Ödön: Magasépítési acélszerkezetek</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Structures V.**			
Course code: NGB_SE004_5		ECTS credits: 3	
Year of study: 3		Semester: 5	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: László Lublóy, Dr., János Guzmics			
Prerequisites: NGB_SE001_2			
Teaching method	Lectures	1	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam		%
	Written exam		%
	Assignments		%

Course contents:
Features and materials of timber structures. Sawn wooden products. The wood as an orthotropic structural material, effects influencing its strength. Design of rectangular and complex cross-sections under bending and shear forces. Connections in timber structures. Dimensioning of connections. Features and design of timber columns. Deformations of timber structures, effects acting on stiffness. Structural materials resisting only to compression. Strength of stone and brick masonry, effects influencing the strength. Quality parameters of brickworks and stoneworks. Slenderness of walls and columns. Calculation of resistance against shear. Vaulting in walls, approximating calculations of internal forces and resistance. Concrete walls. Effect of cracks.

Recommended reading:
Dr. Horváth Sándor: Faanyagú szerkezetek alkalmazása a magas- és mélyépítésben, J 9-1274, Kézirat, Tankönyvkiadó, Budapest 1992.
MSZ 15025-1989. Építmények falazott teherhordó szerkezeteinek erőtani tervezése
EUROCODE 5, MSZ ENV 1995, NAD MSZ ENV 1995

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Geotechnics I.</td></tr>
<tr><td colspan="2">Course code: NGB_SE005_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 4</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Róbert Szepesházi, Dr., Edina Koch</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE001_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>0</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>50</td><td>%</td></tr>
<tr><td>Written exam</td><td>50</td><td>%</td></tr>
<tr><td>Assignments</td><td>0</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Structure and materials of the Earth. Rock classification. Processes and their effects on the Earth crust. Fundamentals of hydrology and hydrogeology. History of the Earth. Owerview of the geology of Hungary. Properties of the soil components, soil structure and composition. Soil classification. Water flow in soils and their effects. Fundamentals of hydraulics. Hydraulic properties of soils. Darcy law. Modelling and solution of seepage problems. Capillarity, thermoosmosis, electroosmosis. Soil freezing. Volume change due to water moving. Rudiments of strength of materials applied in soil mechanics. Characteristics of the mechanical behaviour of soils. The interpretation of soil stresses. Initial soil stresses and the memory of soils. The importance of the water movements due to soil loading. The effects of the stress and strain conditions on soil behaviour. Analysis and testing of soil failure and plasticity. Shear strength characteristics of soils. Testing of the soil shear strength. Modelling of soil deformability: compression and consolidation. Testing of deformability. Advanced models for complex description of mechanical behaviour of soils.</td></tr>
<tr><td colspan="4">Recommended reading:
Szepesházi R.: Geotechnika SZIF–UNIVERSITAS, Győr, 2000.
Szepesházi R.: Geotechnikai példatár I-II. Tankönyvkiadó Budapest 1996.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Geotechnics II.</td></tr>
<tr><td colspan="2">Course code: NGB_SE005_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 5</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Róbert Szepesházi, Dr., Edina Koch</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE005_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>0</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>50</td><td>%</td></tr>
<tr><td>Written exam</td><td>50</td><td>%</td></tr>
<tr><td>Assignments</td><td>0</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Earth pressure: types, calculation principles and methods. Earth pressure theory of Coulomb and Rankine. Principles and methods of slope stability analysis. Bearing capacity of shallow foundations. Basic methods of settlement calculation. Methods for consolidation assessment. Estimation of other soil movements. Elastic bedding calculation according to Winkler. Solution of general earth static problems using FEM computation programs. Principles, considerations, requirements and methods of foundation design. Shallow foundation types and selection. The design requirements and methods of shallow foundations. Earth static design: bearing capacity and settlement. Static design: structural suitability and stability. Execution and monitoring of shallow foundations. Functions, types and classification of pile foundations. Elements and typical examples of piling technologies. Design of pile foundations. Pile bearing capacity estimation.</td></tr>
<tr><td colspan="4">Recommended reading:
Szepesházi R.: Geotechnika SZIF–UNIVERSITAS, Győr, 2000.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Geotechnics III.</td></tr>
<tr><td colspan="2">Course code: NGB_SE005_3</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Róbert Szepesházi, Dr., Edina Koch</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE005_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>0</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>50</td><td>%</td></tr>
<tr><td>Written exam</td><td>50</td><td>%</td></tr>
<tr><td>Assignments</td><td>0</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Types and applications of retaining structures. Supporting systems, sheet pile walls, diaphragm walls, concrete pile walls. Anchors. Gravity, buttress, crib, gabion, reinforced earth walls, soil nailings: structures and construction technologies. Design requirements and methods of retaining structures. Functions, types and characteristics of earth structures. Elements, tools and technologies of earth works. Materials, quality and volume of earth works. Design of earth constructions. Aims, applications and methods of soil improvement techniques. Injections, dewatering and reinforcement of soils. Use of geosynthetics: products, properties, functions and applications. Functions, structures and execution of underground buildings. “Cut and cover” methods. Protection against ground water. Tunnelling methods: NATM and TBM. Preparing of geotechnical design and construction. Soil exploration and field tests. Geotechnical services and documents: soil investigation and testing, reports, expertises, design draws and reports, monitoring. The regulation of the geotechnical activities.</td></tr>
<tr><td colspan="4">Recommended reading:
Szepesházi R.: Geotechnikai példatár I-II. Tankönyvkiadó Budapest 1996.</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Company economics</td></tr>
<tr><td colspan="2">Course code: NGB_SV001_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Marketing and Management</td></tr>
<tr><td colspan="4">Name of lecturer/s: Zoltánné Polyák, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_AK002_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>3</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>0</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>80</td><td>%</td></tr>
<tr><td>Assignments</td><td>20</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Business principles. Company and its environment. Company as an organisation and business unit. Business processes and their characteristics. Planning, leading and managing functions of a manager. Types of business organisations. Company assets, asset assessment. Company groups, buying and selling companies. Company planning and strategy. Methods of strategic planning. Life stages of a company. Functional and innovative strategies. Relationship between strategic and business plans. Marketing functions. Market research. Product policy, pricing. Competitive strategies. R&D (Research and Development). Supply, production, logistics, selling. Human resources. Costs, profitability. Rate of return calculations. Investment policy, credits. Risks, risk management. Crisis management, liquidation. Competitive strategies. Taxing, social security.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Informatics</td></tr>
<tr><td colspan="2">Course code: NGB_SZ003_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 1</td></tr>
<tr><td colspan="4">Responsible department: Department of Mathematics and Computer Sciences</td></tr>
<tr><td colspan="4">Name of lecturer/s: Miklós Szijártó, Dr., Antal Pukler</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Information society, importance of information and information technology, elements of computer systems. Working principle of computers. Neumann’s principle, recent technologies, characteristics of hardware (independent computer systems, networks), software (operation systems, graphic surfaces, network protocols etc.), role of word wide networks, search algorithms, communication, mobile and electronic message delivery, on-line applications, portal design, development and management of informatic systems, safety of informatic systems, application groups: integrated business systems, branch informatic systems, technical design systems, other software supports, role and possibilities of multimedia.</td></tr>
<tr><td colspan="4">Recommended reading:
Raffai Mária: Információtechnológia – Palatia Kiadó, 2004.
Benyó Balázs – Kondorossy Károly – Sziray József: Operációs rendszerek alapjai – Széchenyi István Egyetem 2000</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Informatics/Web-technology</td></tr>
<tr><td colspan="2">Course code: NGB_SZ004_2</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Mathematics and Computer Sciences</td></tr>
<tr><td colspan="4">Name of lecturer/s: Melinda Krankovits</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SZ003_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Definition of Internet and WebPages. HTML programming language. MS FrontPage Webpage designer: menu, tools. Opening and editing HTML pages. Editing fonts, texts. Lists and links. Preparing tables. Multimedia elements in MS FrontPage. Pasting and modifying images. Sounds, animations and videos. Special characteristics of WebPages. Principles and elements of HTML programming. Using frames. Preparing forms. Publishing WebPages on Internet. Use of web servers. Expansion of HTML language: Javascript, VBscript and PHP.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Informatics/Office Program</td></tr>
<tr><td colspan="2">Course code: NGB_SZ004_3</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Mathematics and Computer Sciences</td></tr>
<tr><td colspan="4">Name of lecturer/s: Gábor Kallós, Dr., Antal Pukler</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SZ003_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
MS Word: text editing principles, editing documents, styles, pasting different graphic elements. Advanced use of MS Word.
MS Excel: principles, calculations, formulas, references, functions, editing tables, preparing diagrams, table as a database.
MS PowerPoint presentation making: principles, preparing presentations: typing in texts, editing, visual effects of slide-projecting, images, animations, videos, slide-projecting settings, timings.
Conversions among different program elements and to HTML.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Physical training I. II. III. IV.</td></tr>
<tr><td colspan="2">Course code: NGB_TS001_1 (2,3,4)</td><td colspan="2">ECTS credits: 0</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department:</td></tr>
<tr><td colspan="4">Name of lecturer/s: Bakóné Mária Mészáros, Judit Budaházi,
Tamás Gasztonyi</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>–</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Physical training is compulsory for four semesters. The four semesters consists of:
– swimming,
– running,
– exercises and
– sports knowledge.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
</table>

3.5.b) Optional economic and human courses

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: The civil engineer in the society</td></tr>
<tr><td colspan="2">Course code: NGB_SE002_1</td><td colspan="2">ECTS credits: 2</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Péter Scharle, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="3">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>–</td></tr>
<tr><td>Assignments</td><td></td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Professional knowledge, public administration and politics – interaction and co-operation. Playing fields and roles. Assertion of the engineering competency. Jobs, positions and careers of the civil engineeer. Roles of the engineer in the formulation and implementation of conceptions, policies, strategies, programs and projects. Case studies (renaissance of the railways, motorway network extension). Civil engineering aspects of the socio-economic problems connected with the EU-integration. Levels of the engineer’s performance (mastership, science, art). Roles of the engineer in mediation and in accomplishment and operation of public services. The Chamber of Engineers. Societal significance of technology development, its trends and limits. Roles of civil engineers in the world of enterprises and money. Case studies (urban infrastructure development).</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: History of philosophy</td></tr>
<tr><td colspan="2">Course code: NGB_TT006_1</td><td colspan="2">ECTS credits: 2</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 3</td></tr>
<tr><td colspan="4">Responsible department: Department of Regional Studies and Public Policy</td></tr>
<tr><td colspan="4">Name of lecturer/s: Kornélia Juhász, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>–</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>100</td><td>%</td></tr>
<tr><td>Written exam</td><td>–</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
The students get acquainted with the development of human thinking from the Greek fundament to the XX. century. Aim of the subject is that the students regard philosophical ideas as part of social entirety.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
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<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Engineering communication</td></tr>
<tr><td colspan="2">Course code: NGB_KM003_1</td><td colspan="2">ECTS credits: 2</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Environmental Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Edit Koren, Dr., Tóth-Szabó Zsuzsanna, Dr., Pestiné Éva Rácz</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td></td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>3</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td>100</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
The subject aims to introduce the methods of self-instruction, provide an opportunity for improvement of its practical ability. It deals with the conventional methods of information gaining, selection, attachment, the possibilities of using of library and computing devices. Introduction of individual learning abilities, pelmanism exercises. Practice of knowing ourselves and our fellow-creatures, recognition and usage of meta communication and communication devices. Active application of verbal and written communication forms. Text generation, editing, publication, advertisement, minutes, application, practicing of preparation of CV.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Strategic planning</td></tr>
<tr><td colspan="2">Course code: NGB_ET010_1</td><td colspan="2">ECTS credits: 2</td></tr>
<tr><td colspan="2">Year of study: 2</td><td colspan="2">Semester: 3</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Csaba Koren, Dr., Attila Borsos</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>1</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td>100</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Process of strategic planning, analyses. SWOT analysis. Definition of goals and objectives. Action planning and timing. Strategy implementation. Students prepare strategic planning case studies of construction enterprises, public companies and local governments.</td></tr>
<tr><td colspan="4">Recommended reading:
Marosán Gy. (ifj.): Stratégiai menedzsment. Calibra, Budapest, 1996.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Sociology</td></tr>
<tr><td colspan="2">Course code: NGB_TT005_1</td><td colspan="2">ECTS credits: 2</td></tr>
<tr><td colspan="2">Year of study: 1</td><td colspan="2">Semester: 2</td></tr>
<tr><td colspan="4">Responsible department: Department of Regional Studies and Public Policy</td></tr>
<tr><td colspan="4">Name of lecturer/s: Zoltán Bugovics</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>–</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
On the one hand the students get acquainted with history, schools and methodology of sociology. On the other hand they study the principles of functioning and stratification of society as well as other sciences in relation to sociology (demography, social psychology). They analyse social institutions such as family, organisation and party.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
</table>

3.5.c) Courses of specialisations

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Environmental analysis I.</td></tr>
<tr><td colspan="2">Course code: NGB_KM004_1</td><td colspan="2">ECTS credits: 5</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Environmental Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Miklós Bulla, Dr., Anikó Zseni Dr., Pestiné Éva Rácz</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>30</td><td>%</td></tr>
<tr><td>Written exam</td><td>40</td><td>%</td></tr>
<tr><td>Assignments</td><td>30</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
The place of environmental status evaluation in the environmental management. Environmental management models. Environmental analysis, environmental impact assessment, strategic environmental assessment. Methods of environmental status evaluation, its aspects and information demand. The potentialities of improvement of environmental status evaluation methodology.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Environmental analysis II.</td></tr>
<tr><td colspan="2">Course code: NGB_KM004_2</td><td colspan="2">ECTS credits: 5</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="4">Responsible department: Department of Environmental Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Miklós Bulla, Dr., Anikó Zseni Dr., Pestiné Éva Rácz</td></tr>
<tr><td colspan="4">Prerequisites: NGB_KM004_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>30</td><td>%</td></tr>
<tr><td>Written exam</td><td>40</td><td>%</td></tr>
<tr><td>Assignments</td><td>30</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
The information systems of environmental status evaluation, monitoring. Data sources: soil, water, air, flora and fauna, built environment data. Environmental status of Hungary: environmental load, usage of environmental resources, status of environmental elements/systems. Environmental policy/regulation programs.</td></tr>
<tr><td colspan="4">Recommended reading:</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Public transport</td></tr>
<tr><td colspan="2">Course code: NGB_KO027_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="4">Responsible department: Department of Transportation</td></tr>
<tr><td colspan="4">Name of lecturer/s: István Prileszky, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Role of public transport in the increasing motorisation. Contribution of public transport to sustainable development. Role of service level, its influencing factors and components. Characteristics and measurement of service level. Characteristics of public transport vehicles, application areas. Planning the public transport system, tasks to be solved in certain stages. Typical parameters of network, assessment aspects. Network design methods. Planning process of time schedules, determination of necessary data, calculations. Traffic control. State controlling, managing and financing of public transport.</td></tr>
<tr><td colspan="4">Recommended reading:
Liszkay K., Molnár L.: Város és közlekdése. Városfejlesztési célok, közlekedéshálózati feladatok. Városi közlekedés 1996/6.
Monigl J.: A személyszállítás szabályozásának lehetséges alapelvei. Városi Közlekedés 2000/3.
Garda Zs. Et al.: A tömegközlekedés –fejlesztés új megközelítése a fenntartható mobilitás jegyében. Közlekedéstudományi Szemle: 1999/2.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Building constructions I.**			
Course code: NGB_EP004_1		ECTS credits: 4	
Year of study: 4		Semester: 7	
Responsible department: Department of Architecture Building Construction			
Name of lecturer/s: Attila Koppány, Dr., Éva Kőrössi			
Prerequisites: NGB_EP003_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	3	
	Assignments	2	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
The alternatives of slab constructions. The engineering aspects of choice of slab constructions. Arches. Standard types of old arched slabs. Beam slabs. Slabs with beams. Planked and panel slabs. Flat slabs. Suspended ceiling. Roof constructions. Simple and combined pitched roof. The alternatives of wooden roof constructions. Solutions for spatial bracing of wooden roofs. Steel roofs. Alternative solutions for built-in roofs. Roofing. Hall constructions. Planar and spatial load cyclic hall constructions. Reinforced halls. Steel halls. Spatial bracing of steel halls. Wall constructions of halls. Hall roofing, skylight.

Recommended reading:
Dr. Gábor László: Épületszerkezettan I-IV. Tankönyvkiadó, Budapest.
Dr. Koppány Attila: Épületszerkezettan I-II. jegyzet, Novadat Kiadó, Győr, 1994.
Király Sándor: Szerkezettervezés, csarnokszerkezetek. Ábragyűjtemény. Tankönyvkiadó, Budapest, 1980.
Dr. Seregi György: Acélvázas csarnokok. Terc. Budapest, 2001.
Martin Mittag: Épületszerkezettan. Dialóg Campus Kiadó, Pécs, Budapest, 2004.

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Building constructions II.</td></tr>
<tr><td colspan="2">Course code: NGB_EP004_2</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 8</td></tr>
<tr><td colspan="4">Responsible department: Department of Architecture Building Construction</td></tr>
<tr><td colspan="4">Name of lecturer/s: Attila Koppány, Dr., Attila Somfai, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_EP014_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>2</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Space divider wall constructions. Engineering principles of lightweight facade walls, alternatives of construction. Curtain walls. Columned and frame systems of curtain walls. Undesisting glazed curtain walls with interior ribs. Openings. Operation systems, designing aspects. Doors, gates. Wooden doors. Metal and plastic doors. Windows. Wooden windows. Steel windows. Windows with combined materials. Thermal bridge-free windows. Glass constructions. Glazing of openings. Profile glass and transulent concrete constructions. Shading constructions. Alternative constructions of lightweight dry partitions. Designing aspects of dry partitions. Alternative constructions of suspended ceilings. The range of the materials and constructions of flooring. Designing aspects of flooring. Special floors.</td></tr>
<tr><td colspan="4">Recommended reading:
Dr. Gábor László: Épületszerkezettan I-IV. Tankönyvkiadó, Budapest.
Dr. Koppány Attila: Épületszerkezettan I-II. jegyzet, Novadat Kiadó, Győr, 1994.
Martin Mittag: Épületszerkezettan. Dialóg Campus Kiadó, Budapest,2004.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Traffic engineering I.**			
Course code: NGB_ET009_1		ECTS credits: 3	
Year of study: 3		Semester: 6	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: László Kálmán, Dr.			
Prerequisites: NGB_MA002_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam		%
	Written exam	60	%
	Assignments	40	%

Course contents:
Basic characteristics of traffic flow (traffic volume, speed, density), interrelations among them. Measurement and survey methods of traffic flow characteristics. Vehicle-road relation. Local traffic safety analyses. Environmental impacts and possibilities to influence them. Traffic regulation of running sections. Speed regulation. Types and traffic regulation of grade junctions. Types and traffic regulation of grade-separated junctions. Traffic management with traffic lights. Junctions with signal plan with fix timing. Information systems. Traffic calming. Pedestrians, cyclists. Preference of public transport.

Recommended reading:
Krizsán – Koren: Úttervezés és forgalomtechnika I-II. SZIF.
Az utak forgalmi szabályozásáról és a közúti jelzések elhelyezéséről.
Forgalomtechnikai műszaki szabályzat. 20/1984. (XII. 21.) sz. KM-rendelet

BSc in Civil engineering – Course description			
Course title: **Traffic engineering II.**			
Course code: NGB_ET009_1		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Zsuzsanna Tóth-Szabó, Dr.			
Prerequisites: NGB_ET009_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	3	Pieces
Assessment method	Oral exam	50	%
	Written exam		%
	Assignments	50	%
Course contents: Outlines of transport management. Strategy, goals, tools. Transport demand management. Traditional and intelligent systems. Transport management and environment. Weak participants of transport. Traffic control signal lights. Linking of traffic lights, traffic control centres. Toll collecting systems. Parking control systems. Public transport in the integrated system. Safety management. PR work.			
Recommended reading: Fi: Forgalmi tervezés, technika és menedzsment. Műegyetemi Kiadó, Budapest, 1997.			

BSc in Civil engineering – Course description			
Course title: **Roads I.**			
Course code: NGB_ET011_1		ECTS credits: 3	
Year of study: 3		Semester: 6	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Kálmán Adorjányi, Dr.			
Prerequisites: NGB_ET007_1 and NGB_ET005_2 and NGB_EP002_2			
Teaching method	Lectures	1	Hours
	Seminars / Laboratory works	2	
	Assignments	1	Pieces
Assessment method	Oral exam		%
	Written exam		%
	Assignments		%

Course contents:
Pavement structure types. Pavement structure of low class roads. Material parameters in the dimensioning model. Mechanical models, dimensioning criteria. Design and dimensioning of pavement structures: asphalt, concrete and stone pavements. Strengthtening dimensioning. Subcourses without binder material. Protective courses, dimensioning frost protective course. Technology and construction of hydraulic binder material base course. Stabilisations, lean concrete base courses. Minerals, binders. Asphalt types, characteristics, substances and their examination. Base and pavement courses: function, characteristics, composition, requirements. Quality control. System of road construction investigations. Testing asphalts. Asphalt manufacturing. Design of manufacturing technology, asphalt manufacturing, transportation, working in. Modified binder materials. Use of special materials. Use of thin layers. Characteristics, testing and construction of thin layers. Intermediate courses. Surface dressings. Use of emulsions. Emulsive asphalt mixture. Recycling of road construction materials. Recycling in situ or at mixing plant. Concrete pavements and their materials. Construction and testing of concrete pavements, Construction of stone pavements.

Recommended reading:
Fi István. Utak és környezetük tervezése, Műegyetemi kiadó, Budapest, 2000.
Gáspár László. Útgazdálkodás. Akadémiai kiadó, Budapest, 2003.
Vonatkozó európai szabványok

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Roads II.</td></tr>
<tr><td colspan="2">Course code: NGB_ET011_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Kálmán Adorjányi, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET007_1 and NGB_ET005_2 and NGB_EP002_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>1</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>2</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Complex approach of roads. Pavement Management System (PMS), its subsystems, their function. Structure of costs in PMS, optimising. Evaluation of pavement condition. Pavement outputs, characterisation of condition changes. Survey of road condition parameters. Evaluation of bearing capacity of pavement structure. Static and dynamic measurement methods. Design and dimensioning of strengthening and widening. Design process of intervention technologies. Technology selection. Maintenance of side-roads, shoulders. Construction and maintenance of country roads, farm roads. Maintenance of ditches, gutters, culverts. Maintenance of earthworks. Defects of concrete pavements, causes. Renewal of concrete pavements. Maintenance of concrete pavements, stone pavements. Defects of asphalt pavements, causes. Evaluation of surface condition. Deformations of asphalt pavements, their examination. Maintenance of asphalt pavements: macadam pavements, asphalt concrete pavements. Cold asphalts and their use. Reconstruction of asphalt pavements, mixed coats, spread coats. Thin asphalt concrete courses and their use. Renewal of asphalt pavements, technologies. Recycling technologies: recycling at mixing plants, in situ.</td></tr>
<tr><td colspan="4">Recommended reading:
Gáspár László: Útgazdálkodás. Akadémiai kiadó, Budapest, 2003.
Strassen – III. SZIF jegyzet, Győr, 1996.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Roads III.</td></tr>
<tr><td colspan="2">Course code: NGB_ET011_3</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 8</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Kálmán Adorjányi, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET011_1 and NGB_ET011_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Road operators of roads, highways, local roads. General authority, administration and maintenance tasks. Information system, services. Road control, data collection, condition survey. Cleaning the road, street furniture. Road operation tasks in summer. Treatment of the vegetation, planting, road aesthetics. Traffic engineering tools of ensuring continuous traffic flow. Maintenance of street furniture. Protection against slipperiness. Snow removal, snow protection. Environmental protection tasks. Noise protection, noise walls, noise calming vegetation. Protection of flora and fauna. Operation of engineering workshops and motorway engineer’s workshop. Service facilities and their operation, toll collecting systems.</td></tr>
<tr><td colspan="4">Recommended reading:
Fi István. Utak és környezetük tervezése. Műegyetemi kiadó, 2000.
Utak üzemeltetése és fenntartása.. Tervezési útmutató.
Magyar Útügyi Társaság, Bp. 1998.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Railways I.</td></tr>
<tr><td colspan="2">Course code: NGB_ET012_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Ferenc Horvát, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET007_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>60</td><td>%</td></tr>
<tr><td>Assignments</td><td>40</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Stress calculation of rail, sleeper, ballast and substructure. Turn out constructions. Calculation and setting out of standard and non-standard tack connections. Tasks of railway stations, basic data for their design. Types of railway stations. Technologies of railway track constructions and renewal works.</td></tr>
<tr><td colspan="4">Recommended reading:
Gajári J.: Vasútépítés I. és II. Tankönyvkiadó, Budapest, 1983
Korszerű vasút, korszerű vasúttechnika. Vasútépítés és pályafenntartás I. és II., MÁV Zrt., 1999</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Railways II.**			
Course code: NGB_ET012_2		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Ferenc Kiss, Dr.			
Prerequisites: NGB_ET012_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam	60	%
	Assignments	40	%

Course contents:
Elements of railway maintenance activity, its organisational system. Railway track supervision. Geometrical and constructional track diagnostics. Track measurements by manual tools and measuring cars. Theoretical issues of track measurement tolerances. Tolerance system of Hungarian Railways. Interrelations of the tolerance system and the geometrical qualifications of the track. Deterioration of railway track and its causes. Designing of curve regulations. Measurements needed for planning of curve regulations. Curve regulations based on three-point-principle. Manual track regulations. Theory of mechanical regulation of track direction and level. Mechanical track regulation. Plasser 06, 07, 08 and 09 type regulatory machines. Rail defects and their examination. Rail management and rail renewal. Maintenance of the other parts of superstructure. Supervision of turn outs and their maintenance. Stability issues of railway track. Temperature limits for approved works in the railway track. Rail buckling. Running safety, accident investigation.

Recommended reading:
Gajári J.: Vasútépítés I. és II. Tankönyvkiadó, Budapest, 1983
Korszerű vasút, korszerű vasúttechnika. Vasútépítés és pályafenntartás I. és II., MÁV Zrt., 1999

BSc in Civil engineering – Course description			
Course title: **Railways III.**			
Course code: NGB_ET012_3		ECTS credits: 3	
Year of study: 4		Semester: 8	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Ferenc Horvát, Dr.			
Prerequisites: NGB_ET012_2			
Teaching method	Lectures		Hours
	Seminars / Laboratory works		
	Assignments		Pieces
Assessment method	Oral exam		%
	Written exam		%
	Assignments		%
Course contents: Special issues of establishment and operation of high speed tracks. Ballastless superstructures. Conformity tests of railway superstructures. Railway tunnels. Design directives of tramway tracks and most recent superstructure solutions. Planning directives of underground railways, track superstructures, construction technologies. Cogwheel railways. Cable-railways. Funiculars. Computer aided railway design. Technical based GIS for railway track operation. Track rehabilitation program of Hungarian Railways. The most important results, experiences of track renewal activity in the last decade in Hungary.			
Recommended reading: Gajári J.: Vasútépítés I. és II. Tankönyvkiadó, Budapest, 1983 Korszerű vasút, korszerű vasúttechnika. Vasútépítés és pályafenntartás I. és II., MÁV Zrt., 1999			

BSc in Civil engineering – Course description			
Course title: **Transport construction project I.**			
Course code: NGB_ET013_1		ECTS credits: 3	
Year of study: 3		Semester: 6	
Responsible department: Department of Transport Infrastructure and Municipal Engineering			
Name of lecturer/s: Ferenc Horvát, Dr., István Hausel			
Prerequisites: NGB_ET007_1			
Teaching method	Lectures	–	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam	–	%
	Assignments	100	%
Course contents: Improvement of the students' knowledge in team work, where beside professional results ethical aims also play an important role. Transport construction project (preparation): collective thinking, task-sharing, utilising the advantages of co-operation, individual responsibility to reach the common goal.			
Recommended reading: OTÉK és különféle tervezési szabályzatok, irányelvek, előírások. Építőipari költségvetés kiíró szövegkönyv és áradattár I., II., III., V., VI., ÉMIR – FÉMIR; 1998.			

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Transport construction project II.</td></tr>
<tr><td colspan="2">Course code: NGB_ET013_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Ferenc Horvát, Dr., István Hausel</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET013_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>–</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>–</td><td>%</td></tr>
<tr><td>Assignments</td><td>100</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Clarifying the aim of the project. Preparation of a work plan. Gathering and studying the necessary literature, standards etc., continuous ensuring of the background material of the work. Technical calculations, design. Preparation of detail plans. Examination of construction and management view-points. Analysis of cost factors. Technical report. Closing plan works.</td></tr>
<tr><td colspan="4">Recommended reading:
OTÉK és különféle tervezési szabályzatok, irányelvek, előírások.
Építőipari költségvetés kiíró szövegkönyv és áradattár I., II., III., V., VI., ÉMIR – FÉMIR; 1998.</td></tr>
</table>

<table>
<tr><td colspan="5">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="5">Course title: Communal works I.</td></tr>
<tr><td colspan="3">Course code: NGB_ET014_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="3">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="5">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="5">Name of lecturer/s: Mária Petőcz, Dr.</td></tr>
<tr><td colspan="5">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td></td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="5">Course contents:
Definition and contents of communal engineering tasks, interrelations with other fields, availability of theoretical and practical issues. Hungarian and European situation of infrastructure, characteristics, organisations, financing issues. Asset management of local governments. Possibilities, responsibilities, theoretical and practical considerations. Professional issues of certain fields: environmental protection, communal waste treatment, recycling. Theoretical knowledge, practical implementation with field trip.</td></tr>
<tr><td colspan="5">Recommended reading:
Kontra, Petőcz, Schváb: Kommunális mérnöki feladatok. SZIF. Győr, 1997.
Petőcz, Schváb: Útüzemeltetés és útfenntartás. SZIF. Győr, 1998.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Communal works II.</td></tr>
<tr><td colspan="2">Course code: NGB_ET014_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Mária Petőcz, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_ET014_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td></td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Professional issues of certain fields: public utilities, transport. Characteristics of road and other transport modes. Road traffic issues affecting local governments. Transport in the hierarchy of local governments, responsibilities and decision-making points. Characteristics of operation and maintenance of local infrastructures, interrelations. Noise protection. Causes, tolerance limits, protection. Professional issues of certain fields: air pollution. Causes, tolerance limits, protection. Other fields. Parks, cemeteries, monuments, protected values. Catastrophe defence. Organisational matters. Vis major and emergency measures, preparation, protection, recovery. Linking local governmental work to quality control system.</td></tr>
<tr><td colspan="4">Recommended reading:
Kontra, Petőcz, Schváb: Kommunális mérnöki feladatok. SZIF. Győr, 1997.
Petőcz, Schváb: Útüzemeltetés és útfenntartás. SZIF. Győr, 1998.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Settlement development project I.</td></tr>
<tr><td colspan="2">Course code: NGB_ET015_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Csaba Koren, Dr., István Hausel</td></tr>
<tr><td colspan="4">Prerequisites: NGB_EP001_1 and NGB_MA002_2</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>0</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td>100</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Preparation of settlement development concept. Use of strategic planning tools. Data and information collection. Analysis of social composition and settlement status quo, settlement economy and local governmental management, natural and artificial environment. Overview of international, national and regional interrelations. SWOT analysis. Definitions of goals and objectives. Action plan. Creating priority list. Cost estimation. Identification of financial resources.</td></tr>
<tr><td colspan="4">Recommended reading:
Településfejlesztési füzetek 24. Útmutató a településfejlesztési koncepció készítéséhez BM KIADÓ – 2002</td></tr>
</table>

<table>
<tr><td colspan="5">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="5">Course title: Settlement development project II.</td></tr>
<tr><td colspan="3">Course code: NGB_ET015_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="3">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="5">Responsible department: Department of Transport Infrastructure and Municipal Engineering</td></tr>
<tr><td colspan="5">Name of lecturer/s: Csaba Koren, Dr., István Hausel</td></tr>
<tr><td colspan="5">Prerequisites: NGB_ET015_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>0</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td>100</td><td>%</td></tr>
<tr><td colspan="5">Course contents:
The scope of the subject is the same settlement for which a development concept was worked out. Preparation of settlement structure plan: environment (natural and artificial environment: water, air, earth, climate, flora, fauna, built environment, interrelations), transport (network, cross-sectional), public utilities (water, sewage, rainfall, energy). Preparation of regulatory plan. Sectoral plans: transport (network, cross-sectional), public utilities (water, sewage, rainfall, energy). Determination of built up conditions of a plot of land.</td></tr>
<tr><td colspan="5">Recommended reading:
Országos Településrendezési és Építési Követelményrendszer (OTÉK)</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Urban and Landscape Planning I.**			
Course code: NGB_EV002_1		ECTS credits: 3	
Year of study: 3		Semester: 6	
Responsible department: Department of Urbanism Architectural History			
Name of lecturer/s: Iván Németh, Dr.			
Prerequisites: NGB_ET006_2			
Teaching method	Lectures	0	Hours
	Seminars / Laboratory works	3	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam		%
	Assignments	100	%
Course contents: The students are working on an urban quarter planning assignment. Plans and field observations of the area. Structural connections with other parts of the city. Development proposal. Land use and building patterns in the vicinity. Collecting examples from the literature search. Land use proposal. Building plan. Meeting the needs for infrastructure. Preparing design documents. Oral presentation.			
Recommended reading:			

<table>
<tr><td colspan="5">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="5">Course title: Urban and Landscape Planning II.</td></tr>
<tr><td colspan="3">Course code: NGB_EV002_2</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="3">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="5">Responsible department: Department of Urbanism Architectural History</td></tr>
<tr><td colspan="5">Name of lecturer/s: Katalin Rozsos</td></tr>
<tr><td colspan="5">Prerequisites: –</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>–</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>100</td><td>%</td></tr>
<tr><td>Assignments</td><td>–</td><td>%</td></tr>
<tr><td colspan="5">Course contents:
The acquirement of the basic of urban and landscape planning. Overview of the methodology of planning. The coessential steps of planning: analysis, formation of conception and plan. Different features in the methodology of urban and landscape planning. The regularization of planning by the law and its efficiency in practice. The collision of historical and up-to-date principles. The effect of urban and landscape planning on contemporary architecture. Green areas in the texture of settlement: traditional and new „natural” green channels: evaluation of the system and the planning methods of its improvement.</td></tr>
<tr><td colspan="5">Recommended reading:
Csemez Attila: Tájtervezés, tájrendezés (1996)
Radó Dezső: A növényzet szerepe a környezetvédelemben. Zöld Érdek Alapítvány – Levegő Munkacsoport. Bp. 2001
Ormos Imre: A kerttervezés története és gyakorlata (2000)</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **History of Architecture I.**			
Course code: NGB_EV003_1		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Urbanism Architectural History			
Name of lecturer/s: Tibor Kottmayer			
Prerequisites: –			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	–	
	Assignments	–	Pieces
Assessment method	Oral exam	–	%
	Written exam	100	%
	Assignments	–	%

Course contents:
The development of history of building and architecture, its special methods and its existence on interdisciplinary area. The acquaintance if the building and its surroundings. The extra sense carried by the architecture, the correlation between the age and the building, the world model and reflection. The methodizing scientific description and determination. The architecture of ancient East, the appearance of architecture on the settlement's level. Megalithic architecture. The construction principles of the ancient Hellenistic and classical Greek architecture.
The evolution of the Etruscan architecture, the synthesis of architecture in the Roman Empire. The birth of building, correlation between the designing methods and execution. Ancient solutions surviving in the spatial formation and structures of contemporary architecture.

Recommended reading:
Winkler Gábor: Építészettörténet
Szentkirályi Zoltán: Az építészet világtörténete, 2004 Terc

BSc in Civil engineering – Course description			
Course title: **History of Architecture II.**			
Course code: NGB_EV003_2		ECTS credits: 3	
Year of study: 4		Semester: 8	
Responsible department: Department of Urbanism Architectural History			
Name of lecturer/s: Tibor Kottmayer			
Prerequisites: NGB_EV003_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	–	
	Assignments	–	Pieces
Assessment method	Oral exam	–	%
	Written exam	100	%
	Assignments	–	%

Course contents:
The architecture of Rome and the provinces in the emperor's age. The co-action between architecture and Christianity. The evolution of house types, the rule of function and construction, functional change, the public and residential buildings. The architecture of Eastern Roman Empire, Byzantium's role in history of architecture. The role of central spaces and volumes. The relation of Early Medieval Age with the Roman Empire and Byzantium. The new building types of the Karoling Age. Ravenna's role in the development of Romanic style. The basilica space and its covering. The symbolism of top-view and its functionality. Court architecture and the surviving of towns. The development of gothic construction and its effect on the decoration of surfaces. The appearance of local styles in the architecture of Medieval Age. The exact description and analysis of the volume and facade of (Neoroman or Neogothic) historical building. The role of architectural analogy. The sources and theory of Eclecticism and the strict Historicism.

Recommended reading:
Winkler Gábor: Építészettörténet
Szentkirályi Zoltán: Az építészet világtörténete, 2004 Terc

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Development of Settlements and Regions I.</td></tr>
<tr><td colspan="2">Course code: NGB_RT001_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Regional Studies and Public Policy</td></tr>
<tr><td colspan="4">Name of lecturer/s: Irén Szörényi–Kukorelli Dr.</td></tr>
<tr><td colspan="4">Prerequisites: –</td></tr>
<tr><td rowspan="3">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td>Assignments</td><td></td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>100</td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Settlement geography extracts give overall knowledge to study economic and social processes. Principles. General classification of settlements. Functional classification of cities. Local and positional settlement energies. Economy development effects on settlement development. Social problems of settlements. Environmental harms at settlements. Functioning of city flat market. Cognitive city maps. Urbanisation process on Earth. Settlement network development in Hungary. State administration, land development.</td></tr>
<tr><td colspan="4">Recommended reading:
Jegyzet: Tóth J.–Vuics T. szerk. (1998) Általános társadalomföldrajz I. Dialóg–Campus kiadó, Pécs–Budapest</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Development of Settlements and Regions II.**			
Course code: NGB_RT001_2		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Regional Studies and Public Policy			
Name of lecturer/s: Tamás Hardy, Dr.			
Prerequisites: NGB_AK002_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments		Pieces
Assessment method	Oral exam	100	%
	Written exam		%
	Assignments		%
Course contents: Subject of regional science, components, evaluation aspects, relationship with other sciences. Evaluation dimensions and levels of regional science. Globalisation processes and their effects. Areas of regional economics. Settlement theories and their major characteristics. Issues of settlement selection. Economic and non-economic factors of settlement selection. Minimising transportation costs. Spatial market structures. Spatial division of labour, forms, spatial structure. Local external impacts, local concentration of industrial competitive edges. Rhombus model and regional clusters. Areal economic systems, multiplier, input-output and econometric models.			
Recommended reading: Lengyel I.–Rechnitzer J. 2004: Regionális gazdaságtan. Dialóg Campus Kiadó, Budapest–Pécs.			

BSc in Civil engineering – Course description			
Course title: **Development of Settlements and Regions III.**			
Course code: NGB_RT001_3		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Regional Studies and Public Policy			
Name of lecturer/s: Mihály Lados, Dr.			
Prerequisites: NGB_RT001_1			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments		Pieces
Assessment method	Oral exam	100	%
	Written exam		%
	Assignments		%
Course contents: Regional model of economic development and growth. Mobility of labour force, influencing factors. Mobility of capital, influencing factors. Neoclassical growth models. Technical progress and innovation. Spatial spread of innovations. Relationship between product cycle and regional development. Export base and polarisation growth models. Growth poles and centre-periphery models. Areal stages of economic growth, competitive growth theory. Analysis methods of regional macro economy. Regional competitiveness, influencing factors. Land use. Urban land use.			
Recommended reading: Lengyel I.–Rechnitzer J. 2004: Regionális gazdaságtan. Dialóg Campus Kiadó, Budapest–Pécs.			

BSc in Civil engineering – Course description			
Course title: **Development of Settlements and Regions IV.**			
Course code: NGB_RT001_4		ECTS credits: 3	
Year of study: 4		Semester: 8	
Responsible department: Department of Regional Studies and Public Policy			
Name of lecturer/s: András Grosz, Dr.			
Prerequisites: NGB_RT001_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments		Pieces
Assessment method	Oral exam	100	%
	Written exam		%
	Assignments		%

Course contents:
Definition and subsystems of land development, role of regional policy. Characteristics of regional policy. Characteristics of post modern regional policy (demand and supply oriented development). Most important stages of the development of the EU. Areal co-operations of EU Member States. Regional policy principles of the EU. Regional policy tools of the EU. Projects subsidised from the Structural Funds, changes between 1994-1999 and 2000-2006. EU funds available for the joining countries. EU level land development documents and motives of multi regional co-operations. Development of regional planning and policy in Hungary till 1990. Spatial structure changes and regional policy during the years of transition. Institutionalising the Hungarian regional policy, legal environment. Institutions of the Hungarian land development, changes during the transition. Tools of the Hungarian land development, available resources. Roles of different levels in domestic regional policy. Challenges for the domestic regional policy after joining the EU.

Recommended reading:
Lengyel I.–Rechnitzer J. 2004: Regionális gazdaságtan.
Dialóg Campus Kiadó, Budapest–Pécs.
Lengyel I. (2000): A regionális versenyképességről. – Közgazdasági Szemle, XLVII. évf., december. 962-987. o.

BSc in Civil engineering – Course description			
Course title: **Geotechnics IV.**			
Course code: NGB_SE005_4		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: Róbert Szepesházi, Dr., Edina Koch			
Prerequisites: NGB_SE005_3			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	0	Pieces
Assessment method	Oral exam	50	%
	Written exam	50	%
	Assignments	0	%

Course contents:
Geology of Hungary. Special field and laboratory soil tests. Design of beam and plate foundations. Special problems of pile foundations design. Static and dynamic pile load tests. Design of embedded and anchored retaining structures. Analysis and increase of slope stability. Design and execution of dam foundation: dangers, design, execution and monitoring. Special soil improvement technologies: deep vibration, stone columns, dynamic consolidation, dynamic replacement, jet grouting, deep mixing, micropiling, vacuum consolidation. Design of soil reinforcement: slopes, retaining structures, dam foundations, reinforcing of subgrades, erosion protection. Special problems of earth structures; design and execution. Dewatering. Waste disposals. Soil pollution problems. Special problems of bridge foundations. Abutment structures. Supports in water. Special methods in tunnelling and construction of other underground structures. Damages originated from subsoil: measuring and assessment of movements. Standardisation in geotechnics.

Recommended reading:
Szepesházi R.: Geotechnikai példatár I-II. Tankönyvkiadó Budapest 1996.

BSc in Civil engineering – Course description			
Course title: **Bridges I.**			
Course code: NGB_SE_007_1		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: Zoltán Tóth, Dr., János Guzmics			
Prerequisites: NGB_SE001_2			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	40	%
	Written exam	30	%
	Assignments	30	%

Course contents:
History of bridge construction, trends of development. Loads of bridges, rules and standards of planning, design and construction. Structural arrangements of the substructures: foundations, piers, abutments, wall piers, wing walls. Superstructures of bridges: structural systems and arrangements (plate bridges, beam bridges, prefabricated superstructure bridges, arch and sector bridges, truss bridges, suspended and slanted cable bridges). Bridge platform of public roads and its accessories (isolation, dilatational structures, abutment structures, rails). Calculation principles of the main girders of road and railway bridges. Provisional road and railway bridges, calculation principles and structures. Steady and temporary wooden bridges.

Recommended reading:
dr Tóth Zoltán: Hidak I. Főiskolai jegyzet. NOVADAT BT 2003.

BSc in Civil engineering – Course description			
Course title: **Bridges II.**			
Course code: NGB_SE_007_2		ECTS credits: 4	
Year of study: 4		Semester: 8	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: Zoltán Tóth, Dr., János Guzmics			
Prerequisites: NGB_SE_007_1 and NGB_SE004_2 and NGB_SE004_4			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	–	Pieces
Assessment method	Oral exam	50	%
	Written exam	50	%
	Assignments	–	%

Course contents:
Construction of reinforced concrete bridges: conventional monolith reinforced plate and beam bridges, precast structures, free concreted and free assembled structures. Fabrication and assembling of steel bridges. Fabrication of structural part-units. Different assembling methods: scaffolding, free assembling, floating into position, lifting in, thrusting in. Systems of bridge maintenance and its economic importance. Maintenance of concrete, reinforced concrete, stressed reinforced concrete, steel and stone bridges. Maintenance of the bridge platforms and bridge accessories.

Recommended reading:
Szécsi László–Molnár Viktor.: Hídépítés (SZE jegyzet)
Tóth Zoltán: Hídfenntartás (SZE jegyzet)
dr. Platthy Pál: Közúti acélhidak (BME jegyzet)

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Construction of structures I.</td></tr>
<tr><td colspan="2">Course code: NGB_SE008_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Zoltán Tóth, Dr., György Lőrincz, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE004_1</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Stress states of the stressed reinforced concrete beam. Pre-stressed and post-stressed systems. Stress losses of the pre- and post-stressed beams. Determination of the effective tensile force, calculation of extreme fibre stresses, determination of crushing moment. Analysis of beam-ends, determination of the failure moment. Design of precast beams. Building of monolith reinforced structures. Classical methods: beam, column and wall moulding and scaffoldings. Loads acting on mouldings and on scaffoldings. Modern methods: boarded, sliding mouldings and mobile systems. Applied concrete technology; properties, analysis and qualification of the fresh and solid concrete. Set-up construction and placing of the concrete; transport concrete. Documents of the construction of reinforced concrete structures. Precast reinforced structures. Connections of precast beams: column-beam, column-footing, junctions of column-wall cells. Structural systems, static frame and function of the multilevel building frames.</td></tr>
<tr><td colspan="4">Recommended reading:
Dr. Klatsmányi Tibor: Tartószerkezetek. Feszített vasbetonszerkezetek. Főiskolai jegyzet.
dr. Tóth Zoltán honlapján: Előregyártott szerkezetek és alkalmazott betontechnológia. Oktatási segédlet</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Construction of structures II.**			
Course code: NGB_SE008_2		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: László Lublóy, Dr., György Németh, Dr.			
Prerequisites: NGB_SE004_3			
Teaching method	Lectures	2	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam		%
	Written exam		%
	Assignments		%

Course contents:
Construction, building and assembling of steel structures. Riveted and bolted joints. Establishing of high strength stretched screwed joints. Weldability of steels. Method of welding, technology of welding. Welding strains and internal stress. Tests and qualification of welds. Construction and assembly of structural elements. Assembling methods of steel constructions, technology of assembling. Fire and corrosion protection of steel structures.

Recommended reading:
Halász Ottó, Platthy Pál: Acélszerkezetek

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Construction of structures III.</td></tr>
<tr><td colspan="2">Course code: NGB_SE008_3</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 4</td><td colspan="2">Semester: 8</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: László Lublóy, Dr., János Guzmics</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE004_5</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Analysis and construction of wooden structures and their nodes. Comparison with similar structures made of other materials. Lattice girder. Structural analysis of roof frames and standard timber joints. Design and construction of RR beams. The effect of design upon the frame behaviour. Standard wooden structures, scaffoldings, loads on standard mouldings, construction and design. Dimensioning of contemporary moulding systems.</td></tr>
<tr><td colspan="4">Recommended reading:
Horváth S.: Faanyagú szerkezetek alkalmazása a magas- és mélyépítésben J9-1274 Kézirat, Tankönyvkiadó, Budapest 1992
EUROCODE 5, MSZ ENV 1995, NAD MSZ ENV 1995
Wittmann – Szarka – Kajli: Fa tartószerkezetek gyártása, Műszaki Könyvkiadó, Budapest, 1981.</td></tr>
</table>

<table>
<tr><td colspan="4">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="4">Course title: Construction project I.</td></tr>
<tr><td colspan="2">Course code: NGB_SE009_1</td><td colspan="2">ECTS credits: 3</td></tr>
<tr><td colspan="2">Year of study: 3</td><td colspan="2">Semester: 6</td></tr>
<tr><td colspan="4">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="4">Name of lecturer/s: Csaba Kegyes, Dr., György Lőrincz, Dr.</td></tr>
<tr><td colspan="4">Prerequisites: NGB_SE004_2 and NGB_SE004_4</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>0</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td>1</td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td>–</td><td>%</td></tr>
<tr><td>Written exam</td><td>50</td><td>%</td></tr>
<tr><td>Assignments</td><td>50</td><td>%</td></tr>
<tr><td colspan="4">Course contents:
Getting practice in preparation of realisation of a real engineering project is the aim of the subject, mainly in the phase of tendering. Students in groups of 5-8 become acquainted in and exercise of team-work, making their tasks in accordance with timing. In order to develop their ability of decision-making, “real” problems are to be solved with simulation of real circumstances, practising tasks of project management. The types of tasks are taken from the area of civil engineering construction and have complex nature.</td></tr>
<tr><td colspan="4">Recommended reading:
Dulácska Endre: Statikus tervek kidolgozása. BME Szilárdságtan és Tartószerkezeti Tanszék 1993.
Karácson Sándor, Kollár Lajos: Mérnöki tervezéselmélet.
Műegyetemi kiadó Budapest, 1996.
Feigenbaum: Teljes körű minőségbiztosítás. Ex Qualitas Libri Kft 1991.
Bankó Sándor: Építésigazgatási és építésjogi ismeretek.
Műegyetemi Kiadó Budapest, 1996.
Gyulai, Hollay, Száva, Wéber: Az építész- és építőmérnöki tevékenység a beruházás folyamatában.
Kis Papp László: Ágazati menedzsment. Műegyetemi Kiadó Budapest, 1996.</td></tr>
</table>

BSc in Civil engineering – Course description			
Course title: **Construction project II.**			
Course code: NGB_SE009_2		ECTS credits: 3	
Year of study: 4		Semester: 7	
Responsible department: Department of Structural Engineering			
Name of lecturer/s: Csaba Kegyes, Dr., György Lőrincz, Dr.			
Prerequisites: NGB_SE004_5			
Teaching method	Lectures	0	Hours
	Seminars / Laboratory works	1	
	Assignments	1	Pieces
Assessment method	Oral exam	–	%
	Written exam	50	%
	Assignments	50	%

Course contents:
Students practice engineering activity of technology and quality management, planning and inspection, in the phase of execution. In order to develop team-work, they work again in groups of 5-8 students, according to a system made together, with personal responsibility and continuous harmonisation. The types of tasks are taken from the area of civil engineering construction and have complex nature.

Recommended reading:
Dulácska Endre: Statikus tervek kidolgozása. BME Szilárdságtan és Tartószerkezeti Tanszék 1993.
Karácson Sándor, Kollár Lajos: Mérnöki tervezéselmélet.
Műegyetemi kiadó Budapest, 1996.
Feigenbaum: Teljes körű minőségbiztosítás. Ex Qualitas Libri Kft 1991.
Bankó Sándor: Építésigazgatási és építésjogi ismeretek.
Műegyetemi Kiadó Budapest, 1996.
Gyulai, Hollay, Száva, Wéber: Az építész- és építőmérnöki tevékenység a beruházás folyamatában.
Kis Papp László: Ágazati menedzsment. Műegyetemi Kiadó Budapest, 1996.

<table>
<tr><td colspan="5">BSc in Civil engineering – Course description</td></tr>
<tr><td colspan="5">Course title: Analysis of structures</td></tr>
<tr><td colspan="3">Course code: NGB_SE010_1</td><td colspan="2">ECTS credits: 4</td></tr>
<tr><td colspan="3">Year of study: 4</td><td colspan="2">Semester: 7</td></tr>
<tr><td colspan="5">Responsible department: Department of Structural Engineering</td></tr>
<tr><td colspan="5">Name of lecturer/s: György Lőrincz, Dr.</td></tr>
<tr><td colspan="5">Prerequisites: NGB_SE001_3</td></tr>
<tr><td rowspan="2">Teaching method</td><td>Lectures</td><td>2</td><td rowspan="2">Hours</td></tr>
<tr><td>Seminars / Laboratory works</td><td>1</td></tr>
<tr><td></td><td>Assignments</td><td></td><td>Pieces</td></tr>
<tr><td rowspan="3">Assessment method</td><td>Oral exam</td><td></td><td>%</td></tr>
<tr><td>Written exam</td><td></td><td>%</td></tr>
<tr><td>Assignments</td><td></td><td>%</td></tr>
<tr><td colspan="5">Course contents:
Modelling of structural systems and structural elements. Possibilities and consequences of selection and variation. Stiffness and flexibility requirements. Determination of loads. Computation of internal forces and deformations. Acceptability conditions of structures. Influence lines and their application on statically determinate structures. Maximum diagrams of internal forces. Statically indeterminate structures. Principles and computational technics; comparison and evaluation of the solution methods. Beams on elastic supports and elastic bedding. Particular problems of simple frameworks. Basic data and elementary relationships of the displacement method, application on indeterminate frameworks. Procedure of Cross.</td></tr>
<tr><td colspan="5">Recommended reading:
Kurutzné Kovács Márta: Tartók statikája – Műegyetem Kiadó, 2003.
Pásztor Erzsébet – Tamássy Tamás:Tartók statikája Példatár I. – Műegyetem Kiadó, 1999.
Gáspár Zsolt – Tarnai Tibor: Statika – Műegyetem Kiadó, 2002.</td></tr>
</table>

4) General information for students

4.1) City of Győr

Situated half way along the road between Budapest and Vienna, Győr, with its 130,000 inhabitants, is one of the most fortuitously situated cities in Hungary. Close to the western border, located at a meeting point of major highways, railways, and three rivers (the Danube, Rába and Mosoni-Duna), Győr has for centuries been virtually unavoidable for anyone travelling to Western Europe.

The restoration of its Baroque downtown was awarded a European Prize for the Protection of Historic Buildings. With an important commercial and industrial heritage, Győr is today one of the most dynamically developing cities in Hungary.

Hungarian branches of multinational companies (e.g., Phillips and Audi) have established themselves here, encouraged by the presence of the existing large Hungarian companies (such as RÁBA). As a result, an enormous demand has been generated in the region for a highly skilled labour force.

4.2) Accessibility

Transportation to Hungary

Hungary is small enough for you not to need to get around by air. International air traffic goes through one airport, Ferihegy, near Budapest. From the airport you can take a minibus to your destination. The Airport Minibus Service has a desk at the airport, so you will find them easily. This service has a set price independent of your destination within Budapest, but you should call it 24 hrs before you travel. When it's time to leave the country you can call the minibus to pick you up from your door: Have a nice trip!

Airport Minibus Service (http://www.bud.hu/english) It costs 2.100 HUF/ person. To return to the airport you must order the minibus 24 hours in advance. A taxi from the airport to a railway or bus station should cost no more than 5,000 HUF.

Transportation from Budapest

By train: Trains departing from Keleti Station arrive in Győr in 85 minutes. Besides the 10 InterCity trains that run daily, most international express trains from Western Europe stop in Győr, so it is possible to reach the city without having to go through Budapest, which makes a change.

Train tickets are fairly cheap in Hungary once you have a student card. Intercity trains are the smoothest way to travel: they are fast and comfortable, and tickets cost only 440 HUF more than for an ordinary train. Train tickets must be purchased in advance at the train station or from a travel agent.

The very smart site www.elvira.hu, will help you plan your route and give you information on ticket prices.

By bus: Buses depart from Népliget bus station and the journey time is approx. 1,5 hour. International buses (from Vienna, Bratislava, Prague and Munich) also have scheduled stops in Győr.

By car: Take the M1 motorway. Győr is 125 km west from Budapest, although this motorway goes all the way to Vienna.

Arriving in Győr

The railway station is in the middle of the city, behind the City Hall (Városháza). From the station, head through the centre, then cross the Mosoni-Duna river. The university is approximately 15 minutes from there. The bus station is located next to the railway station. The direct services to the university and to the student hostels are buses No. 2 and 23.

Incoming rules in Hungary

For a stay of less than 90 days every six months in Hungary, EU citizens or non-EU citizens do not need a visa, but if their stay exceeds the period of 90 days they must apply for a residence permit at the Ministry of Internal Affairs, Bureau of Immigration and Citizenship-Regional Directorate. Please note that in case of some countries the visa-free period only covers 30 days!
Citizens of the UK can stay in Hungary without a visa for six months. Applications for visas must be submitted at the Hungarian Embassy in the home country. (The process of issuing a visa takes 1 month maximum and will be valid for one year maximum.)

Staying in Hungary longer than three months requires a residence permit. Application for a residence permit must be forwarded to the authorities in question at least 15 days before the end of their authorised stay in the country (citizens staying on a visa basis – 15 days before the expire of the visa; citizens staying without a visa – 15 days before the end of their 90-day stay).

There are two types of residence permit:
– valid for less than 12 months, or (the expiry date of the residence permit coincides with that of the work permit; students can obtain a residence permit for one year maximum after which they might apply for its extension.)
– valid for more than 12 months.

In the case of students, the residence permit can be issued each semester for a period of one year. After the expiry date of this period, students may apply for the extension of the residence permit provided that their status has not changed.

To apply for either kind of residence permit, or to extend an existing one, the following are needed:
– a visa (in case of non-EU citizens),
– a completed application form,
– registration of residence (student hostel, hotel, motel, proof of rent or other),
– duty stamps (to a value of 5000 HUF, can be purchased at post offices),
– a valid passport,
– a passport photo,
– an official medical certificate (issued by the competent county institute of the State Public Health and Medical Administration according to the Hungarian residence of the applicant.).

The necessary forms are available from local offices of the Ministry of Internal Affairs, Bureau of Immigration and Citizenship.

Students carrying out regular studies in Hungary as part of a co-operation programme may undertake paid work (without time/hour limit).

4.3) Accommodation

For the students applying to the university's programs we offer the possibility to have a place in the university student hostel, or provide help to find a flat to rent.

University Hostel

The hostel is an important scene to develop a communal life. It could be a place where friendship can be made; student community comes alive during the years you spend here.

In the two buildings of the University we are able to host 1620 student. 40% of the place is for the first year students. The occupation is for a whole academic year is preferred but there are always some places kept for the foreign student, you just have to apply in due time for accommodation (July 15 for the winter semester and November 15 for the spring semester)

Fees: The hostel fees are to be paid by remittance in every month and the cost is 5000 HUF/person in the double bed room. Those who has a personal PC we can offer a wide band internet connection for half a year, costs 5000 HUF.

Rent a flat

If there are no more places in the student hostel or you don't like to live with others together you have the possibility to rent a flat in the town. Győr is a university town, so there are plenty of renting flats during the academic year. The prices are about 40.000 – 50.000 HUF/Month (150–200 EUR) + overhead costs (like electricity, water, heating etc.) depending on the number of the rooms and the location of the flat. If you rent an apartment, the postman will show up with your water, gas and electricity bills on a monthly basis. You must pay these by cash at the post office or by bank transfer. If you fail to pay them on time you will get a warm-hearted letter from the financial department of the provider in question telling you how late your payment is and informing you about the interest on your overdue payment. This is the first step. The second step is cutting your supply off. In Hungary, appliances run on 220-volts electricity. If the plug on your appliance does not fit into the socket you can buy an adapter at an electrical store.

4.4) Health and social care

Free number for the ambulance service: 104
General emergency number: 112
This is the number you should call if you see, or are involved in, an accident. Hungarian doctors are famous throughout the world for their expertise, so you can trust them no matter what. First aid and emergency medical care is free for foreigners, the rest you will have to pay for, if you don't have a health insurance, valid in Hungary. State hospitals do not charge much but if you go to a private clinic you can expect to pay quite a bit more. If you participate in an international student exchange program or study at a state institute you can get free medical care also in the campus, at the university doctor. Take your residence permit and your attendance certificate and contact the local Health Insurance Fund. (9023 Győr, Szabolcska M. u. 1/A – phone: (+36 96) 311-359)

Pharmacies sell a number of over-the-counter products for less serious complaints. There are pharmacies open 24 hours a day, but you have to pay an additional 100 to 200 HUF if you go at night. You will find a bell by the door, which you have to press to speak with the pharmacist.

From 1 November, 2005 the medical care of EU citizens is ensured on the basis of the European Health Insurance Card just like in any other EU state. Agreements with non-EU states remain in force after the accession as well. With Romania the introduction of a form-based medical-care (similar to the EU states) assurance is envisaged in the near future, in case of being Romanian citizens please inquire about the actual legislation before coming to Hungary.

In the case of the citizens of a non-EU state the insurance system is regulated by bilateral agreements. In case there is no such agreement with the country in question the provision of medical assistance is regulated by Hungarian legislation. If you are staying here at your own expense you should either purchase the most suitable insurance package at home or join the Voluntary Insurance Group in Hungary (the cost is 100% of the minimum wage).

The Széchenyi István University is prepared to accept handicapped students. We have special passages for rolling chairs and all the rooms, offices in the campus are available for invalid persons.

4.5) Shopping

Stores are generally open from 10 am to 6 pm. Smaller shops may also close for a lunch break. Stores in shopping malls are open until later (7 or 8 pm). There are two kinds of non-stop shop: the little convenience store in the city centre and the giant supermarket. Supermarkets are cheaper than inner-city stores and regularly offer special deals to attract consumers. If you have plenty of time to spend shopping for your meat, vegetables and fruits, the best place to do it is at the local market (piac or csarnok). Goods are still cheaper there.

The monthly net average wage in Hungary is 103 000 HUF (380 EUR) per month, an amount that allows only limited fun. In fact you have to do a lot of math to make it last until the end of the month. If you want to pay your rent, go out occasionally, and have the odd meal at a restaurant you need at least 75–100 000 HUF (3–400 EUR).

Here is a list of essentials to give you a rough idea of prices

1 kg loaf of bread	200–300 HUF	0,8–1,2 EUR
1 litre milk	190–240 HUF	0,76–0,96 EUR
6 eggs	150 HUF	0,6 EUR
1 kg sugar	140 HUF	0,56 EUR
1 bottle of beer	260 HUF	1 EUR
1 bottle of wine	500–3000 HUF	2–12 EUR
single bus ticket	170 HUF	0,68 EUR
student pass	2360 HUF	9,44 EUR
cinema ticket	1400 HUF	5 EUR
museum entry fee	500–1000 HUF	2–4 EUR
postage for a letter or postcard (domestic)	50 HUF	0,2 EUR
postage for a letter or postcard (international)	110–170 HUF	0,6–0,7 EUR

The official currency is the forint, or Hungarian forint (HUF). The coins in use are 1, 2, 5, 10, 20, 50 and 100 forints. Banknotes come in denominations of 200, 500, 1 000, 2 000, 5 000, 10 000, and 20 000 – with elaborate graphic designs. There are also Braille signs on them for the visually impaired. Money can be exchanged and retrieved in banks or at ATMs (which you can find in the campus or in the city centre). The exchange rate does not vary a great deal but it is still a good idea to check two or three places before the transaction. Most banks do not charge commission but pay you the exact amount according to the exchange rate. However, certain bank machines situated in the most attractive spots of the city centre may charge 2 to 3% commission. There is a growing number of places that accept the most popular credit cards (American Express, Mastercard, Eurocard, Visa, etc.). In general you should ask the vendor or look out for the symbols on the shop window.

As a foreigner you may also open a bank account in Hungary, based on HUF or any other currency. This is called a non-residential account and all you need to open one is your passport. Money can be transferred at post offices and banks. The HUF is fully convertible, so feel free!

The Euro will probably not be in use until 2010, but in certain places you will see prices quoted in euros for comparison. One EUR is between 260–270 HUF.

5) Information on ECTS

5.1) ECTS credits

The European Credit Transfer and Accumulation System is a student-centred system based on the student workload required to achieve the objectives of a programme.

ECTS credits are a numerical value (between 1 and 60) allocated to course units to describe the student workload required to complete them. They reflect the quantity of work each course unit requires in relation to the total quantity of work necessary to complete a full year of academic study at the institution, that is, lectures, practical work, seminars, tutorials, fieldwork, private study – in the library or at home – and examinations or other assessment activities. ECTS is thus based on a full student workload and not limited to contact hours only.

ECTS credits are a relative rather than an absolute measure of student workload. They only specify how much of a year's workload a course unit represents at the institution or department allocating the credits.

In ECTS, 60 credits represent the workload of an academic year of study and normally 30 credits for a semester and 20 credits for a term.

ECTS credits ensure that the programme will be reasonable in terms of workload for the period of study abroad.

For other credit systems based exclusively on class contact hours the use of a conversion factor may still be appropriate provided the other workload elements mentioned above are accounted for.

Sometimes there is an uneven distribution of workload between the semesters within an academic year but this should not constitute a major problem provided that the academic year totals 60 credits. Should it be the case, a note about it in the Information Package will avoid surprises to students who are constructing a programme of study abroad which includes course units from different years of study.

The overall philosophy of ECTS is to allow for flexibility and this applies to the allocation of credits. It is up to the institutions to demonstrate consistency in allocating credits between similar programmes of study.

5.2) Student Application Form

(Photograph)

ACADEMIC YEAR 2006/2007

FIELD OF STUDY: .....

This application should be completed in BLACK in order to be easily copied and/or telefaxed.

SENDING INSTITUTION
Name and full address:
.....
.....
Contact coordinator – name, telephone and telefax numbers, e-mail box ....
.....
.....
Institutional coordinator – name, telephone and telefax numbers, e-mail box
.....
.....

STUDENT'S PERSONAL DATA
(to be completed by the student applying)

Family name:	First name (s):
.....	.....
Date of birth:	
.....	e-mail address:
Sex:	.....@.....
Nationality:	
Place of birth:	
.....	
Current address:	Permanent address (home): .....
.....	.....
.....	.....
.....	.....
Current address is valid until:	
.....	
Tel.:	Tel.:
.....	.....

LIST OF INSTITUTIONS WHICH WILL RECEIVE THIS APPLICATION FORM (in order of preference):

Institution	Country	Period of study from to	Duration of stay (months)	N° of expected ECTS credits
1.	.....	....	.....	.....
2.	.....	....	.....	.....
3.	.....	....	.....	.....

Name of student:
.....

Sending institution: .....

Country: .....

Briefly state the reasons why you wish to study abroad?

.....

.....

.....

LANGUAGE COMPETENCE

Mother tongue: .....

Language of instruction at home institution (if different): .....

Other languages	I am currently studying this language		I have sufficient knowledge to follow lectures		I would have sufficient knowledge to follow lectures if I had some extra preparation	
	yes	no	yes	no	yes	no
.....	☐	☐	☐	☐	☐	☐
.....	☐	☐	☐	☐	☐	☐
.....	☐	☐	☐	☐	☐	☐

WORK EXPERIENCE RELATED TO CURRENT STUDY (if relevant)

Type of work experience	Firm/organisation	Dates	Country
.....	.....	.....	.....
.....	.....	.....	.....

PREVIOUS AND CURRENT STUDY

Diploma/degree for which you are currently studying:

.....

Number of higher education study years prior to departure abroad:

.....

Have you already been studying abroad? Yes ☐ No ☐

If Yes, when? At which institution?

.....

The attached <u>Transcript of records</u> includes full details of previous and current higher education study. Details not known at the time of application will provided at a later stage.

Do you wish to apply for a mobility grant to assist towards the additional costs of your study period abroad? Yes ☐ No ☐

RECEIVING INSTITUTION

We hereby acknowledge receipt of the application, the proposed learning agreement and the candidate's Transcript of records.

The above-mentioned student is ☐ provisionally accepted at our institution
☐ not accepted at our institution
☐ Institutional coordinator's signature

Departmental coordinator's signature

....

Date: Date:

....

5.3) Transcript of Records

NAME OF SENDING INSTITUTION: .....
Erasmus ID code: .....
Faculty/Department: .....
Departmental coordinator: .....
Tel.: ..... Fax: ..... e-mail box: .....
NAME OF STUDENT: .....
date and place of birth: .....
(sex) :.....
NAME OF RECEIVING INSTITUTION: .....
Faculty/Department of .....
Erasmus ID code: .....
Departmental coordinator: .....
Tel.: ..... Fax: ..... e-mail box: .....

Course Unit code (1)	Title of the course unit	Duration of course unit (2)	Local grade (3)	ECTS grade (4)	ECTS credits (5)
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
					Total .....

to be continued on a separate sheet
(1) (2) (3) (4) (5) see explanation on back page

Diploma/degree awarded: .....

Date Signature of registrar/dean/administration officer

Stamp of institution:

(1) Course unit code:
Refer to the ECTS information Package

(2) Duration of course unit:
Y = 1 full academic year
1S = 1 semester 2S = 2 semesters
1T = 1 term/trimester 2T = 2 terms/trimesters

(3) Description of the institutional grading system:

.....

.....

.....

(4) ECTS grading scale:

ECTS Grade	% of successful students normally achieving the grade	Definition
A	10	EXCELLENT outstanding performance with only minor errors
B	25	VERY GOOD above the average standard but with some errors
C	30	GOOD generally sound work with a number of notable errors
D	25	SATISFACTORY fair but with significant shortcomings
E	10	SUFFICIENT performance meets the minimum criteria
FX	–	FAIL some more work required before the credit can be awarded
F	–	FAIL considerable further work is required

(5) ECTS credits:

1 full academic year	=	60 credits
1 semester	=	30 credits
1 term/trimester	=	20 credits

5.4) Request for Accommodation

Dear Student,

in the case of the accommodation during your study at the Széchenyi István University in Győr / Hungary, please fill the next questionnaire:

a.) □ I don't require accommodation during my study or

b.) □ I apply for a place in the student hostel of the university:

It is a double room at our on campus student hostel amongst Hungarian students. Depending on the number of students, you might have to share the room with another student.

The room costs cca. 5 EUR/person/night, that means cca. 150 EUR/person a month. You have to pay the rent once a month in Hungarian Forint (unfortunately we do not accepted a credit card, but there is an ATM in Campus)

Name: .....

Sex: □ male/□ female

Date of arriving: day.....month.....year.....

Date of leaving: day.....month.....year.....

c.)

□ I can find the way to the university alone

□ I need help to find the way to the university.

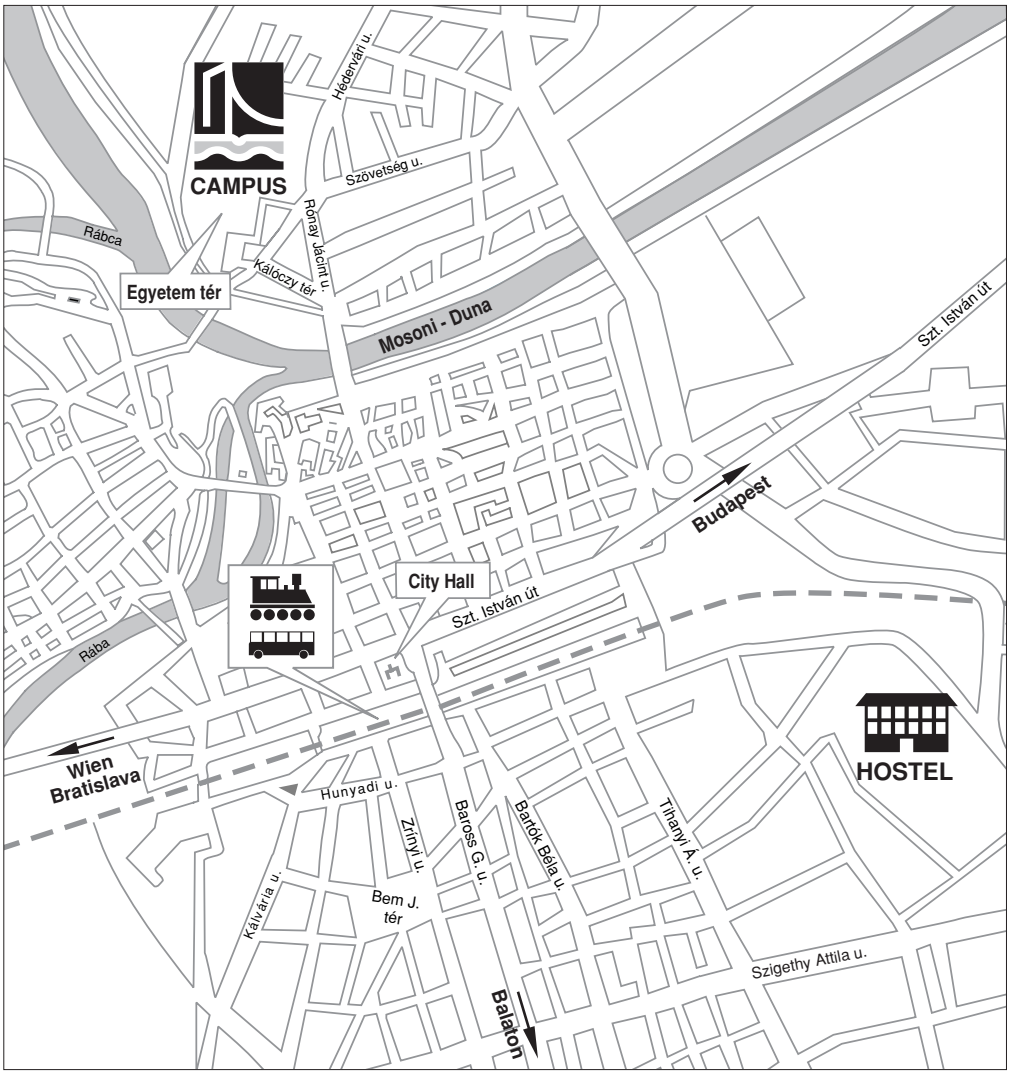
Please send me a map to the next fax number or e-mail address:

.....

Date:.....

.....

signature of the student


CAMPUS
Hédervári u.
Szövetség u.
Rónay Jácint u.
Rábca
Kálóczy tér
Egyetem tér
Mosoni - Duna
Szt. István út
Budapest
City Hall
Szt. István út
Rába
Wien
Bratislava
HOSTEL
Hunyadi u.
Zrínyi u.
Baross G. u.
Bartók Béla u.
Tihanyi Á. u.
Kálvária u.
Bem J. tér
Szigethy Attila u.
Balaton