



UNIVERSITY OF PRISHTINA  
“HASAN PRISHTINA”

FACULTY OF CIVIL ENGINEERING  
DEPARTMENT ROAD INFRASTRUCTURE – MSc.

2014 – 2017

## 2.3. Study Program in Evaluation: Road Infrastructure – Master Level

### 2.3.1. Basic Information for the Study Program

Description (name) of the academic programme	Study Program: Road Infrastructure
NFQ Level (BA, MA, PhD, doctorate programme, university course)	Level 7 MA
Academic degree or certificate, spelled out in full and in abbreviated form	Master of Civil Engineering – Study Programme: Road Infrastructure MSc. of Civil Engineering – study programme Road Infrastructure
Study field according to Erasmus Subject area Code (ESAC)	06.4. Civil Engineering
Profile of the academic programme / Scientific position	Road Infrastructure
Minimum period of study	Minimum 2 years of studying.
Type, structure and cycle (full time or part time)	Full time
Number of ECTS	120 ECTS , 60 ECTS per year
Programm (short overview)/Courses	<p><b>Obligatory:</b></p> <p><b>Sem.I</b></p> <ol style="list-style-type: none"> <li>1. Scientific Research Methodology</li> <li>2. Transportation Engineering</li> <li>3. Road Design</li> <li>4. Project Management</li> </ol> <p><b>Sem.II</b></p> <ol style="list-style-type: none"> <li>1. Pavement Structures</li> <li>2. Road Junctions &amp; Intersections</li> <li>3. Construction Management</li> </ol> <p><b>Sem.III</b></p> <ol style="list-style-type: none"> <li>1. Road Drainage</li> <li>2. Road Signs and Markings</li> <li>3. Road Maintenance</li> </ol> <p><b>Electives:</b></p> <p><b>Sem. I</b></p> <ol style="list-style-type: none"> <li>4. Advanced Statistics</li> <li>5. Combinatoric Optimization</li> <li>6. Railway Design and Construction</li> <li>7. Traffic Noise</li> <li>8. Application of Geodesy in Infrastructure projects</li> <li>9. Technical English Language I</li> <li>10. Technical German Language I</li> </ol> <p><b>Sem. II</b></p> <ol style="list-style-type: none"> <li>1. Construction Materials in</li> </ol>

	<p>Infrastructure</p> <ol style="list-style-type: none"> <li>2. Concrete in Road Construction</li> <li>3. Quality Management</li> <li>4. Methods for Soil Improvement</li> <li>5. Applied Geology</li> <li>6. Technical English Language II</li> <li>7. Technical German Language II</li> </ol> <p><b>Sem. III</b></p> <ol style="list-style-type: none"> <li>1. Bridges</li> <li>2. Airports</li> <li>3. Tunnels</li> <li>4. Environmental Protection</li> <li>5. Engineering Economics</li> <li>6. Urban Traffic</li> <li>7. Earthwork and transportation techniques</li> <li>8. Bitumen and Polimers</li> </ol>
Number of student places	20 students
Person in charge of the academic programme	Prof.Asoc.dr. Naser Kabashi,
Scientific/artistic staff (number per staff category)	15 profesors, 5 lecturers and 10 teaching assistants
Tuition fees	According to UP tariffs 250 Euro/ semester

### 2.3.2. Programme Study's Rationale for Labor Market

Construction development trends in our country are at the highest point of the activities being compared to the last 10-20 years. Demand for the new inhabited area at the urban rural areas is growing on the yearly basis. New Urban development projects show an increase need for new urban areas of residential, public and other buildings. The private sector economy is having positive growth at the last decade. These society demands directly creates new demand for new constructions, sites and areas. Our country have very low urban and rural development and there is a permanent need for additional foreign investment by the various entities. Configuration of Kosovo, its assets, the relation towards the population always have enough potential for capital investments in many sectors such are: industry, transport, tourism, small economy - individual sector etc.

All these requirements can be converted to the need for new specialised staff in the field of Civil Engineering, Construction Engineering Hydro and Road Infrastructure Engineering as well.

### 2.3.3 International Comparability of the Study Program

Road Infrastructure study program in Master Level is comprised of subjects that are comparable to the countries of the South Eastern Europe. This program is about 75% comparable with the University of Zagreb - Faculty of Civil Engineering in Zagreb.

### **2.3.4 Target group of a Study Program**

The Master study program of Road Infrastructure is offered to the candidates that have previously finished the three years study level Bachelor of Civil Engineering departments of Construction Engineering and Hydrotechnics and have 180 ECTS credits gained by previous studies.

### **2.3.5 The Orientation of Program of Study Lead by the Principles of the Institution**

Master in Road Infrastructure Study Program is an important part of the studies in the Department of Civil Engineering and is in full compliance with defined mission for faculty development, leading respectively to the principles of the institution.

### **2.3.6 Goal and profile of Study Program: Road Infrastructure – Master Level**

The Road Infrastructure Master study level, has the goal to create the professional personnel that will deal with the issues in this area. The aim is to equip students with needed competences for the area of planning, design, construction, supervision and needed calculation for road and Infrastructure projects, as well as management in the area of Road Infrastructure.

- To expand the research knowledge in the field of road infrastructure
- To provide for the Kosovo market and further, personnel who may be in the role of leadership in technical solutions in the road infrastructure and construction engineering practices.
- To provide the solution of current engineering problems in the road infrastructure construction
- To provide knowledge for the continuation of studies or scientific research to PhD level.

### **2.2.7 Learning Outcomes**

- To recognize the orientation of the road infrastructure towards the advancement and application of new methods and materials.
- To apply theoretical Know how in practical and experimental part of the road construction.
- To understand how to solve complex problems with scientific basis and provide appropriate solutions.
- To know with own knowledge to support improval of the construction requirements in accordance with the Standard.

### **2.3.8 The ratio between theoretical and practical part of the study**

The studying at Road Infrastructure Master study level is conducted in such way that in every subject there is a theoretical part, numerical, and practical part of a subject.

Averagely, the ratio between theoretical and the practical part of the study is 60% for the theoretical part and 40% for the practical part in the form of elaborates.

### 2.3.9. Calculation of ECTS

According to the Statute of the UP, for 1 ECTS are calculated per 25 studying hours. An example of working load calculation that reflects into assigning the ECTS to a course.

Activity	Hours	Day	Week	Total
Lectures	2		15	30
Theoretical excercises/laboratory	2		15	30
Practical work	1		15	15
Contacts with lecturer/consultations	1		15	15
Field excercises				
Colocfiums, seminars				
Home work	1		10	30
Self study time (in library or at home)	2		10	20
Final preparation for the exam				20
Time spent on evaluation (tests, quizzes, final exam)	1		10	10
Projects, presentations, etc.				
Total				150

$$150/25 = 6 \text{ ECTS}$$

### 2.2.10. Practical work – Internship

For the practice Civil Engineering Faculty, Engineering Department where it belongs the road infrastructure programme has sign the memorandum of understanding (MoU) with local and international companies working in domain of roads and civil engineering projects. These MoU gave significant results for previous students of two generations.

- Master programe students of road infrastructure have made practical work to local companies and to International Company **Bechtel & Enka** during construction of „ Morine – Merdare” highway in duration of 3 months. During the period of practical work the students have participated actively in all departments of the contractor such are: design, draina earthworks, structures, installations, alerts, laboratory works.
- **Ministry of Infrastructure- Directorate roads**, Students of the past two generations have actively participated in the programs of the Ministry of Infrastructure for summer and winter maintenance organized by this Ministry.
- Private Companies such are: **Granite Istok, Altrade Pristina and Lika Decan**, have engaged in practical work in engineering positions students of master program from our Faculty last two summer seasons.

### 2.2.11. The Plan for Research for the Evaluated Program/Programs

The research is oriented in several directions:

- Existing infrastructure assessment based on European Standards
- Materials in Road Infrastructure

- Analysis and possibilities for the use of stone mastic asphalt in road infrastructure
- The possibility of using concrete layers in road infrastructure
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### 2.2.12. Registration and Selection of the Candidates

Selection of candidates is done according to the following criteria:

The ranking is done according to the average grades from the bachelor level, and that :

- The students with GPA = 7.5 , directly without the entry exam and ranking till the request number
- The students with GPA < 7.5 will submit the entry exam, to complete the free spaces, till the requested number.
- The ranking will be for the request number.\

### 2.2.13.The Study Program

#### Study Plan:

First Year – Semester I						
			Hours/ Week			
N	O	Subject	L	E	ECTS	Professor
1.	O	Scientific Research Methodology	2	1	3	Prof. Asoc Dr. Violeta Nushi
2.	O	Transportation Engineering	2	2	6	Prof.dr.Musli Bajraktari
3.	O	Road Design	2	2	6	From out of UP/ Mr. Sc. Esat Gashi
4.	O	Project Management	2	1	3	Prof. Asoc.DDR. Davorin Kralj/ Mr.sc. Ilir Rodiqi
		<b>TOTAL</b>	<b>8</b>	<b>4</b>	<b>18</b>	
6.	E	Advanced Statistics	2	0	3	Prof.dr.Fevzi Berisha
7.	E	Combinatoric Optimization	2	0	3	Prof.dr.Abdullah Zejnullahu
8.	E	Railway Design	2	2	6	Mr.sc.Fitim Shala
9.	E	Traffic Noise	2	1	6	Prof.asoc.dr.Naser Kabashi
10.	E	Application of Geodesy in Infrastructure Projects	2	1	3	Prof.asoc.dr.Murat Meha
11.	E	Technical English Language I	2	0	3	Nedime Belegu, lek
12.	E	Technical German Language I	2	0	3	Prof. ass. Dr. Milote Sadiku

First Year – Semester II						
			Hours/ Week			
N		Subject	L	E	ECTS	Professor
1.	O	Pavement Structures	3	2	6	Prof. dr. Yusuf Kagan Demir/ Mr.sc. Cene Krasniqi
2.	O	Road Junctions & Intersections	2	2	6	External staff of UP/ Mr. Sc. Esat Gashi
3	O	Construction Management	2	2	6	Prof. DDr. Davorin Kralj/ Mr. Sc. Esat Gashi
		<b>TOTAL</b>	<b>7</b>	<b>6</b>	<b>18</b>	

4.	E	Construction Materials in Infrastructure	2	2	6	Prof.asoc.dr.Naser Kabashi
5.	E	Concrete in Road Construction	2	1	3	Prof. asoc. dr. Naser Kabashi
6.	E	Quality Management	2	2	6	Prof. Asoc. DDR. Davorin Kralj/ Mr. Sc. Esat Gashi
7.	E	Methods for Soil Improvement	2	1	3	Prof. dr. Fikret Ahmedi/ Mr.sc.Qani Kadiri
8.	E	Applied Geology	2	0	3	Prof.asoc.dr.Islam Fejza
9.	E	Technical English Language II	2	0	3	Nedime Belegu, lek
10.	E	Technical German Language	2	0	3	Prof. Ass. Dr. Milote Sadiku

<b>Second Year – Semester III</b>						
			<b>Hours/ Week</b>			
		<b>Subjects</b>	<b>L</b>	<b>E</b>	<b>ECTS</b>	<b>Professor</b>
1.	O	Road Drainage	2	2	6	Prof. Ass.dr. Laura Kusari
2.	O	Road Signs and Markings	2	2	6	Prof.asoc.dr.Sedullah Avdiu
3.	O	Road Maintenance	2	2	6	Ministry of Infrastructure/ Prof. asoc.dr Naser Kabashi
		<b>TOTAL</b>	<b>6</b>	<b>6</b>	<b>18</b>	
4.	E	Bridges	2	2	6	Mr.sc Shaban Perjuci
5.	E	Airports	2	1	3	Prof.ass.dr.Misin Misini
6.	E	Tunnels	2	2	6	Prof.dr.Fikret Ahmedi
7.	E	Environmental Protection	2	1	3	Prof.dr. Fetah Halili
8.	E	Engineering Economics	2	2	6	Prof.dr. Envet Kutllovci/ Msc. Esat Gashi
9.	E	Urban Traffic	2	1	3	IDA Dukagjin Hasimja, ligj
10.	E	Earthwork and transportation techniques	2	1	3	Prof. dr. Fikret Ahmedi/ Ministria e Infrastruktures
11.	E	Bitumen and Polimers	2	1	3	Prof.asoc.dr.Naser Kabashi

<b>Second Year – Semester IV</b>						
			<b>Hours/ Week</b>			
		<b>Subject</b>	<b>L</b>	<b>E</b>	<b>ECTS</b>	<b>Professor</b>
1.	O	Thesis Work	/	/	30	/
		<b>Totali</b>	<b>/</b>	<b>/</b>	<b>30</b>	

**2.3.14.COURSE DESCRIPTION:**  
SCIENTIFIC RESEARCH METHODS

**Introduction:** Collection, study and systematization of information. ng, types and verification of hypotheses. Meaning, scope and elements characteristic of the seminar notes. Data collection. Analysis of the data. Methods of research work. Modelling methods .Statistical method. Mathematical methods. Experimental methods. Communications Theory as method. The case study method. Visual methods. Method of survey and interviews

**Learning outcomes and results:** After completion of the course candidates will be able to write different reports , different texts and will be able to complete the narrative aspect of scientific work including the Master thesis

**Volume and engagement of works for this course: 2+1, 3 ECTS**

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	1	1	15	15
Practical work				
Contact with lecturer / consultation	1	1	3	3
Field practice				
Tests and seminars	1	1	10	10
Home work				
Independent study (library or at home)	1	1	5	5
Preparing for final exam	2	5	1	10
The time presented during the evaluation (tests; quiz and final exam)	3	1	1	3
Projects , presentation and ect	2	1	1	2
<b>Total</b>				<b>78</b>

**Teaching and Learning Methods:** Lecturing, preparation of case studies and presentation

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

**Ratio between theoretical and practical part:**

Theoretical part	Practical part
60%	40%

Primary literature: Zelenika R. Methodology and technology prepared the research work, Rijeka 1999;Fellows,R.; Liu, A. Research Methods for Constructions, Oxford: The Blackwell Science, 1997; Holt.D.G.: A guide to succesful dissertation study for students of the built environment.



## TRANSPORTATION ENGINEERING

**Introduction:** Definition of traffic terms and techniques. Theory of traffic flow. Development of vehicle and traffic flow theory. Definition and measurements of variations in traffic flow based on: traffic, traffic and traffic density. Relations between variations in traffic flow under: Liaison spaces and partial reports of variations. Traffic circulation patterns: microscopic and macroscopic models and their liaison reports. The ability of different issue and road services: concept development, definition of elements and their impact. Traffic loads on the road: traffic count, traffic flow in wire processing and receipt of data, connotations cargo traffic on the road. Ability issuing of road and intersections: motorway, multilane carriageways, dual carriageway, different types of junctions.

**Learning outcomes and results:** After completing of this course ,student will be able to recognize participants in traffic and application of technology and scientific principles to the planning, functional design, operation and management of facilities for any mode of transportation in order to ensure safe movement, efficient, fast, comfortable for transport of people and goods. Students will be able after performing of this subject that in the first satge of the road design to propose options for rational design of traffic lanes as well.

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	1	1	15	15
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice				
Tests and seminars	1	1	15	15
Home work	2	1	5	10
Independent study (library or at home)	2	3	5	30
Preparing for final exam	6	5	1	30
The time presented during the evaluation (tests; quiz and final exam)	4	2	1	8
Projects , presentation and ect	1	2	1	2
Total				150

**Teaching and Learning Methods:** Lecturing, exercises, preparation of presentations , individual & field work etc.

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
60%	40%

Primar literature: : Bajraktari M Inxhinieria e transportit – Ligjerata te autorizuar, Wright ,W.P Norman,j.A Transportation Engineering: Planning and Design, 4th Edition.

## ROAD DESIGN

**Introduction:** Design rules. Modeling solutions. Space Limitations. Digital terrain models, digital models of solutions. Operations models. Horizontal Alignment. Vertical Alignment. Cross Sections. Normal profile, Stopping side Distance. Sight Distance. Volume calculation method. Sloping plan. Procedures of Design preparation. Cost benefit analysis and determining priorities , mass diagram, breakdown of earthwork quantities

**Learning outcomes and results:** After completing of this course ,student will be able to understand , analyse and design one road geometry including possible variants taking in consideration terrain, land in use and economic aspects of the proposal .

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice				
Tests and seminars	2	1	10	20
Home work	2	1	10	20
Independent study (library or at home)	1	3	5	15
Preparing for final exam	3	5	1	15
The time presented during the evaluation (tests; quiz and final exam)	4	2	1	8
Projects , presentation and ect	1	3	1	3
Total				151

**Teaching and Learning Methods:** Lecturing, exercises, preparation of presentations , individual & field work etc.

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
40%	60%

Primary literature: Gashi E. Projektimi i rrugëve – Ligjerata te autorizuar, AASHTO A policy on geometric design of highways and streets green book 2004

## PROJECT MANAGEMENT

**Introduction:** Basic principles of management: what is the management, who are managers. Development of the management, management development, management functions. Working persistence; definition of Determination, the problems and errors in decision making, styles and ways of putting the decision-making methods, methods of forecasting. Project management: definition, project leader, project goals, type of project. The composition of the economy and his circle; basics organization management, organizational goals, organizational structure, technological aspects, economic and social organization, the impact of district organizational structure, job specifications of the participants in construction. Planning the working process: nature, reason and purpose of management planning process. Control of working processes: financial control of construction project.

**Learning outcomes and results::** After completing of this course ,student will be able to understand and properly use in practice definitions of management,major principles of organization and operational management of one project. Other main goal of this subject in particular is that future engineers and experts easily to overpass difficulties of one project in regard to the management.

### Volume and engagement of works for this course: 2+0, 3 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory				
Practical work				
Contact with lecturer / consultation				
Field practice	1	1	5	5
Tests and seminars				
Home work				
Independent study (library or at home)	1	3	5	15
Preparing for final exam	3	2	3	18
The time presented during the evaluation (tests; quiz and final exam)	3	1	1	3
Projects , presentation and ect	1	4	1	4
Total				75

**Teaching and Learning Methods:** Lecturing, preparation of presentations , individual home work etc.

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

**Ratio between theoretical and practical part:**

Theoretical part	Practical part
80%	20%

Primary literature: : Menadžent za inženjere, Mariza Katavic, Sveucilište u u, Gradevinski Fakultet, Zagreb 2006. Literatura e propozuar: Menagement for the Construction Industry, Stephen Lavender, Longman and T Chartered Institute of Building, Esee, England 1996.

## PAVEMENT STRUCTURES

**Introduction:** Introduction and general terms. Historical Review of construction. Contemporary road construction components (asphalt paved roads, concrete paved roads). Components that affect the design, building and maintaining the road construction.

Sub-base (Sub-base of natural materials, sub-base by stabilizing materials). Supporting layers (sub base from granular material, cement stabilized sub base, bituminous sub base). Road asphalt layers (bituminous subbase, emulsions, asphalt concrete wearing courses, concrete wearing courses splitmastikasphalt). Design of new road construction (road design construction with asphalt and concrete). Design of reconstruction and strengthening of road construction.

**Learning outcomes and results:** After completing of this course, student will be able to understand and properly use in practice definitions of road layers, to calculate the number and thicknesses of each road layer, to analyse and design design mixes of different road layers. To design flexible and rigid road structures.

### Volume and engagement of works for this course: 3+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	3	1	15	45
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	15	15
Field practice				
Tests and seminars				
Home work				
Independent study (library or at home)	2	3	5	30
Preparing for final exam	2	5	2	20
The time presented during the evaluation (tests; quiz and final exam)	3	2	1	6
Projects, presentation and ect	1	3	1	3
<b>Total</b>				<b>149</b>

**Teaching and Learning Methods:** Lecturing, preparation of case studies, individual home work and presentation.

**Evaluation Methods and criteria:** Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
60%	40%

Primary literature: : Babic, B. Projektiranje kolnicikih konstrukcija. 1997. Horvat, Z. Gradenje i održavanje kolnicikih konstrukcija. 1985. Roberts, F., i drugi: Vruce asfalte mješavine. 1996. / Literatura e propozuar: Opci tehnicki ubjeti za radove na cestama. 2001

## ROAD JUNCTIONS AND ROAD INTERSECTIONS

**Introduction:** Traffic flow at the junctions, directions of traffic flow, canalizing of traffic flow. The criterion for the selection of junction, circulating construction. Types of junctions. Geometry of car path at the curves. Types of vehicles, trajectory of movement and methods. Directions (lines) at junctions: form of directions acceleration and deceleration lines Resting spots, type, function and form. Slip roads connecting at the intersections in the separate graded junctions . At the level junctions, ranking, design. Separate graded junctions ranking, design. Interchanges: ranking design, interchanges, types of interchanges , multilevel interchanges.

**Learning outcomes and results:** After completing of this course ,student will be able to design different types of junctions, roundabouts, interchanges and separate garded interchanges .

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice				
Tests and seminars	2	1	15	30
Home work	2	1	5	10
Independent study (library or at home)	1	3	5	15
Preparing for final exam	3	5	1	15
The time presented during the evaluation (tests; quiz and final exam)	3	2	1	6
Projects , presentation and ect	1	3	1	3
Total				149

**Teaching and Learning Methods:** Lecturing, preparation of case studies , individual home work and presentation .

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
40%	60%

Primary literature: Gashi E. Projektimi i udhekryqeve dhe nyjeve – Ligjerata te autorizuar, AASHTO A policy on geometric design of highways and streets green book 2004,

## CONSTRUCTION MANAGEMENT

**Introduction:** Investment plans, project evaluation and construction planning methods, Construction law, Construction standards, time management, planning techniques, programming in construction engineering, critical path method, PERT method, control of construction, Theory of Construction Management, construction project finances, budgeting, human resources in construction projects, Construction techniques, specifications in projects, drawings, BoQ, BoP, Literature: Kralj D. Construction Management, Halpin W. Daniel Construction Management, fourth edition John Wiley & Sons, Oct 18, 2010.

**Learning outcomes and results;** After completion of this course the Student will be able to understand principles of the Construction Management starting from early stages of one project such as feasibility and resource planning. Another important element of this course is knowledge which student/future Engineer will gain on project scheduling and follow up of such plans during the construction

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice	2	1	10	20
Tests and seminars	2	1	15	30
Home work				
Independent study (library or at home)	1	3	5	15
Preparing for final exam	3	5	1	15
The time presented during the evaluation (tests; quiz and final exam)	3	1	1	3
Projects, presentation and ect	2	1	1	2
Total				155

**Teaching and Learning Methods:** Lecturing will be taught as a group lecturing, field studies, case studies, workshops and student presentations

**Evaluation Methods and criteria:** Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
50 %	50 %

Primary literature: - Kralj D. Construction Management, Halpin W. Daniel Construction Management, fourth edition John Wiley & Sons, Oct 18, 2010.

## ROAD DRAINAGE

**Introduction:** Pavement layers, Cross slopes, road surface details of storm water evacuation , ditches, pipe ditches, line ditches, pipe and concrete culverts, drainage of paved surfaces, underground portable water levels, drainage of underground water, drainage of road layers, geotextiles, geogrids, evacuation of storm water from slopes, cut slopes fill slopes, discharge of drainage in to the natura catchment, water treatment facilities, lagoons, drained water treatment.

**Learning outcomes and results;** After the course completion student and future road Engineer will be able to understand, design, to construct properlu road drainage facilities

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice				
Tests and seminars	1	1	15	15
Home work	2	1	15	30
Independent study (library or at home)	1	3	5	15
Preparing for final exam	3	5	1	15
The time presented during the evaluation (tests; quiz and final exam)	3	1	1	3
Projects , presentation and ect	2	1	1	2
Total				150

**Teaching and Learning Methods:** Lecturing will be tught as a group lecturing, field studies, case studies, workshops and student presentations

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
50 %	50 %

Primary literature: Kusari L. Authorised lectures , Pitman P. External works roads and drainage, Taylor and Francis 1 edition 2007

## ROAD SIGNS AND MARKINGS

**Introduction:** General Terms and definitions. Equipment and road traffic safety. Vertical signalisation: traffic signs, risk, information, strict orders and performing various signs. Horizontal signs: longitudinal, transverse and other markings on the road. The marking during the construction . Equipment for marking the road edges: guiding poles, other signs. Road barriers: steel, concrete, and wire barriers . Construction of noise protection: walls, different noise protectors. Other road ancillaries: automatic counters of traffic, meteorological station on the road, telephone cabins, protection from snow, wind protection

**Learning outcomes and results;** After the completion of this course students will be able to understand, design construct and supervise the neseceray road equipment and horizontal and vertical signalization.

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	1	1	15	15
Practical work	2	1	15	30
Contact with lecturer / consultation				
Field practice	1	1	10	10
Tests and seminars	2	1	5	10
Home work	2	1	10	20
Independent study (library or at home)	1	1	15	15
Preparing for final exam	3	1	5	15
The time presented during the evaluation (tests; quiz and final exam)	3	1	1	3
Projects , presentation and ect	3	1	1	3
Total				151

**Teaching and Learning Methods:** Lecturing, preparation of case studies , field work, individual home work and presentation

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
50%	50 %

Primary literature: - Opci tehnicki uvjeti za radove na cestama. Zagreb: Hrvatske ceste i Hrvatske auroceste, 2001. Benz Kotzen, Colin English, E nmental nise Barriers, London, 1999.god



## ROAD MAINTENANCE

**Introduction:** Introduction. fundamental basics of road management. Maintenance of roads (definition, purpose and economy). Evaluation road condition (types of damages, method of data collection for roads, road condition assessment based on data collection. Maintenance of roads with from asphalt concrete. Maintenance of concrete roads. Refurbishment of asphalt road construction (w h improvement, with full replacement of full road construction, combination of hening and full replacement). Reconstruction of a concrete road. holes and other deformations/improvements occurred during the working in the infrastructure of municipalities. structures composition and elements of the road network maintenance management. Managing with road models (HDM III, the system dTIMS IAPMS).

**Learning outcomes and results;** After the course completion the student will gain information and knowledge regarding the planning and maintenance of the road network in general and about the improvement of road section in particular. Also the future engineer will have knowledge for routine maintenance and operational maintenance of road network .

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work	5	1	3	15
Contact with lecturer / consultation				
Field practice	5	1	3	15
Tests and seminars	1	1	15	15
Home work				
Independent study (library or at home)	2	1	10	20
Preparing for final exam	3	1	6	18
The time presented during the evaluation (tests; quiz and final exam)	3		1	3
Projects , presentation and ect	3	1	1	3
Total				149

**Teaching and Learning Methods:** Lecturing, preparation of case studies , laboratory and testing works, case studies, individual home work and presentation

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
50%	50%

Primary literature: Srsen, M.: Odrzavanje cesta, Gradevni godisnjak, HSGI, Zagreb, 2000.; Dragcevic V., Korlaet Z., Rukavina T., Biljeske za predavanja

## RAILWAY DESIGN AND CONSTRUCTION

**Introduction:** General characteristics of railway. The basis of calculation of the train traction: the train resistance, the attraction force of the locomotive, train mass, the attractive force. Indicators of rail conveyor circulation. The rails circular region, limiting the flow of goods and passengers. Railway Design: Horizontal Alignment / Vertical Alignment, the number of circulation lanes. Design of rails: Design Softwares. Stages of the design: feasibility study, conceptual design, Main Design. Evaluation of selected variants: methods for evaluating of alternatives. Calculation of rail capacity: issuing and circulation of rail capacity. Reconstruction single line rail track: basic definitions of reconstruction. Designing the second rails: ways of building a second rail line, positioning in relation to the objects

**Learning outcomes and results:** After completing of this course, student will be able to understand, analyse and design one railway geometry including possible variants taking in consideration terrain, land in use and economic aspects of the proposal.

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice				
Tests and seminars	2	1	15	30
Home work	2	1	5	10
Independent study (library or at home)	1	3	5	15
Preparing for final exam	3	5	1	15
The time presented during the evaluation (tests; quiz and final exam)	4	2	1	8
Projects, presentation and ect	1	3	1	3
<b>Total</b>				<b>151</b>

**Teaching and Learning Methods:** Lecturing, exercises, preparation of presentations, individual home work etc.

**Evaluation Methods and criteria:** Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

**Ratio between theoretical and practical part:**

Theoretical part	Practical part
50%	60%

Primary literature: : Marusic, D. Projektiranje i gradenje želznickih pruga. Split: Građevinski fakultet.

## TRAFFIC NOISE

**Introduction** General terms. Traffic Noise: sources of noise, impact on quality of life and work. Regulations on the subject of noise protection: rules and regulations applicable, the European Commission recommendations, the noise cards. Traffic noise measurements: equipment, verification and processing of measurement results. Methods of estimation: the parameters of the impact, extent of noise models. Protective measures against noise: reduction at source, reduction at the emission place, economic measures. Monitoring- Control of measurements.

**Learning outcomes and results:** After the finishing of this course student will be able to understand pollution created by traffic, this subject will give to the students knowledge how to design, built and maintain less volume noise structures, how to design/construct noise barriers and to suggest adequate solution for traffic improvement in regard to noise to use and to understand the principles of dynamic of structure pollution.

### Volume and engagement of works for this course: 2+1, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	1	1	15	15
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice	3	5	1	15
Tests and seminars	1	1	10	10
Home work				
Independent study (library or at home)	2	3	5	30
Preparing for final exam	6	5	1	30
The time presented during the evaluation (tests; quiz and final exam)	4	2	1	8
Projects , presentation and ect	1	2	1	2
Total				150

**Teaching and Learning Methods:** Lecturing, exercises, preparation of presentation , field works etc.

**Evaluation Methods and criteria:** Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part:

Theoretical part	Practical part
50%	50%

Primary literature: Lakušić, S. Dragcevi, V; Rukavina T. Utjecaj buke od prometa u poslovno-stambenim zonama grada Azgreba. Zagreb: Gradevinski Fakultet, 2004. , Opci tehnicki uvjet za radove na cestama. Zagreb: Hrvatske ceste i Hrvatske autoceste, 001, Upustva za koristeje softëarskog paketa LIMA™ Environmetnal Noise Calculation and Mapping Softëare Versison 4.4, Denmark, 2004,

## TECHNICAL ENGLISH LANGUAGE I

**Introduction:** Introduction to Technical English Language course . Inzhinieria construction as a profession . Reasons for choosing in hinjerisè as a profession . The main principles of building materials . Creating modern structures . Environmental Inzhinieria . Bridges and tunnels . High buildings . Compilation of sentences using technical vocabulary . High dams .

**Learning objectives:** Check the knowledge of English , acquired in previous with emphasis on English grammar ,- Improve and increase to a higher level of English, with an emphasis on the language used in the professional literature and business correspondence .

**Learning outcomes and results ;** The student must know the basic terminology in English professional technical in engineering , The student must know the language to the extent that utilize professional literature in the English language and the web resources for further study ,  
The student must know the basic terminology in the fields of construction , such as in construction , Hydrotechnics , architecture and road infrastructure .

### - Volume and quantity of work required (hours per semester ECTS)

Activities	Hours	Days	Week	Total
Lectures	2	0	15	30
exercises / laboratory	0	0	0	0
Tutorial work	0	0	0	0
Contacts with the teacher/consultation	2	0	15	30
Field exercises	0	0	0	0
Colloquies, Seminars	2	0	2	4
Homeworkk	1	0	15	15
Own study time Student (at the library or at home)	1.5		15	23,5
Preparation for final exam				20
Time spend on assessment (tests, sreak, final exam)	2			6
Projects, Presantations, etc..	1			1
Total				

**Teaching and Learning Methods** Teaching achieved with regular method , in the form of the lecture group , with regular exercises and group

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part

Theoretical Part	Practice
100%	0%

Literature used in the course :

Lectures offered by his teacher; Internet - Sites Big Building program, Brantacan, ASCEN

## TECHNICAL GERMAN LANGUAGE I

**Introduction:** "Technical German Language" is practical subjects that enable students to become familiar with German terminology in the field of technology, where besides the grammatical structures and vocabulary typically used for communication in technical professions. The purpose of this course is to expand students' knowledge about the field of technical terminology and develop their powers of general language. Students will be introduced to the professional field of language technology will be introduced to the structure of scientific texts will be read and interpret professional texts, as well as techniques and strategies work.

**Learning outcomes and results:** To enable students to communicate in German in their professional field of technology, Students to enhance their professional competence, To provide students with strategies that help them understand unfamiliar words, to derive important information from scientific texts and develop their own texts, eg formal reports or letters, To develop receptive and productive skills of students in the field of engineering.

### Volume and quantity of work required ( hours per semester ECTS )

Activities	Hours	Days	Week	Total
Lectures	2	0	15	30
exercises / laboratory	0	0	0	0
Tutorial work	0	0	0	0
Contacts with the teacher/consultation	2	0	15	30
Field exercises	0	0	0	0
Colloquies, Seminars	2	0	2	4
Homeworkk	1	0	15	15
Own study time Student (at the library or at home)	1.5		15	23,5
Preparation for final exam				20
Time spend on assessment (tests, sreak, final exam)	2			6
Projects, Presantations, etc..	1			1
total				

**Teaching and Learning Methods** Teaching achieved with regular method, in the form of the lecture group, with regular exercises and group

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part

Theoretical Part	Practice
100%	0%

Basic Literature: Rosemarie Buhlmann, Anneliese Fearn (2013): Technisches Deutsch für Ausbildung und Beruf: Lehr- und Arbeitsbuch. Europa Lehrmittel, Goethe Institut.

## CONSTRUCTION MATERIALS IN INFRASTRUCTURE

**Introduction:** Introduction and general terms of materials in infrastructure. Types of materials, design mixes of the road layers, asphalt mixtures in road construction, concrete mixtures in road construction, unbound design mixes, bound design mixes, bitumen in the road construction, Bituminous Materials, properties and examinations of main properties. Asphalt and the main properties such a building material

**Learning outcomes and results:** After completing of this course ,student will be able to understand and properly use in practice different materials in road infrastructure. Proper application and testing of these materials in laboratory and field,

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work	4	1	3	12
Contact with lecturer / consultation	1	1	8	8
Field practice	8	1	1	8
Tests and seminars	2	4	4	8
Home work	2	8	8	16
Independent study (library or at home)	1	15	15	15
Preparing for final exam	2	2	3	12
The time presented during the evaluation (tests; quiz and final exam)	4	1	1	4
Projects , presentation and ect	2	1	1	2
Total				145

**Teaching and Learning Methods:** Lecturing, preparation of case studies , laboratory work, field work, individual home work and presentatio .

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part

Theoretical part	Practical part
60%	40%

Primary literature: : Kabashi, Materialet ndertimore FNA, Prishtine; Michael S. Mamlouk, John P. Zaniewski Materials for Civil and Construction Engineers

## QUALITY MANAGEMENT

**Introduction:** Introduction and general terms, Inspection and Supervision, Workmanship, Contract Document, Plans and Specifications, statistical methods in specifications, Method specifications, QA/QC, performance related and performance based specifications, Quality Assurance, Quality Control, testing subgrade, typical test, routine test, construction considerations, sample preparation, design methodology, timing, construction inspection, training and certifications, files and records, elements of quality assurance programme, internal audit, external audit, disputes, laboratories, requirements for personnel accreditations, performance monitoring; literature Managing Construction Purchasing Contract Buyout Qa/Qc Methods Negotiation Strategies

**Learning outcomes and results:** After completing of this course, student will be able to understand needs for quality management in one road projects with particular aim for quality assurance and quality control of the materials and in general for the organization. Requirements for establishing the laboratories being temporary permanent or mobile laboratory, requirements for application of ISO quality management standards in one road organization.

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice	2	1	10	20
Tests and seminars	1	1	5	5
Home work	1	1	15	15
Independent study (library or at home)	1	3	5	15
Preparing for final exam	3	5	1	15
The time presented during the evaluation (tests; quiz and final exam)	4	2	1	8
Projects, presentation and ect	1	3	1	3
Total				151

**Teaching and Learning Methods:** Lecturing, preparation of case studies, field work, individual home work and presentation.

**Evaluation Methods and criteria:** Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part

Theoretical part	Practical part
40%	60%

Primary literature: : John G. McConville ; Quality in Construction works; handbook for Quality Management.

## TUNNELS

**Introduction** Entities of the tunnels. The meaning of constructing tunnels examples of international and local tunnels. The parameters and values for designing of tunnels, road tunnels, rail tunnels and underground tunnels (subway). Methods of RMR rock mass classification, composition Q, NATM. Excavation methods and construction of the rocky mass of links, classic methods, modern methods. Adecco-RS method, mining, deformation and mining safety. Constructions portals (entry). Safety in tunnels, infrastructure measures, security equipment, measures for users.

**Learning outcomes and results:** History of tunnels construction, reason of tunnels application, tunnels classification, tunnels application, research works for the projection of tunnels, classification of rock mass, technical elements for the projection of tunnels – hydrotechnic tunnels, tunnels construction. To learn how to design a road tunnels, to know evaluating the favourable position and variant of tunnel, to know calculating tunnels in static manner, and, to know constructing road tunnels.

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	1	1	15	15
Practical work				
Contact with lecturer / consultation	1	1	10	10
Field practice	1	1	10	10
Tests and seminars	2	1	5	10
Home work	2	1	10	20
Independent study (library or at home)	2	1	15	30
Preparing for final exam	3	1	5	15
The time presented during the evaluation (tests; quiz and final exam)	4	2	1	8
Projects , presentation and ect	2	1	1	2
Total				150

**Teaching and Learning Methods:** Lecturing, preparation of case studies , field work, individual home work and presentation

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part

Theoretical part	Practical part
60%	40%

Basic literature: - Banjad, I; Tuneli, GF, Zagreb, 1986; (Metode izvedbe t nela str. 163-194); Marusic, D.: Projektiranje i gradnje zeljeznickih pruga, GF Sveucilista u Splitu,1994. Lunardi 2000. Design & constructing tunnels – ADECO-RS approach, T&T International special supplement, May 2000.



## ENGINEERING ECONOMICS

**Introduction** Introduction to Engineering Economics, why Engineers need to learn economics, economic environment, determination of objectives, identification of strategic factors, determination of means, evaluation of engineering proposals, assistance in decision makings, Infrastructure expenditure decision place versus repair decisions, Selection of inspection method, Selection of a replacement for an equipment , labor savings , Efficiency in manufacturing or capital use, First (or Initial) Cost Operation and Maintenance Cost ,Fixed Cost ,Variable Cost ,Incremental or Marginal Cost , Sunk Cost ,Life-Cycle Cost, Demand curve , Supply curve, Elasticity of demand, Law of diminishing return. Cash flow diagrams, financial management of project.

**Learning outcomes and results:** After course completion the student will gain information about the financial part of the project, including economic and financial analysis and feasibility of a project in order tha Engineers during design, construction or maintenance of the road network engineers have thorough knowledge about the project's finance and cost.

### Volume and engagement of works for this course: 2+2, 6 ECTS

Activity	Hours	Day	week	Total
Lecture	2	1	15	30
Theoretical exercises/ Laboratory	2	1	15	30
Practical work				
Contact with lecturer / consultation	1	1	15	15
Field practice				
Tests and seminars	1	1	15	15
Home work	2	1	15	30
Independent study (library or at home)	2	1	5	10
Preparing for final exam	3	1	50	15
The time presented during the evaluation (tests; quiz and final exam)	3		1	3
Projects , presentation and ect	3	1	1	3
Total				151

**Teaching and Learning Methods:** Lecturing, preparation of case studies , individual home work and presentation

**Evaluation Methods and criteria:**Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

### Ratio between theoretical and practical part

Theoretical part	Practical part
50%	50%

Basic literature: Donald N, Engineering Economic Analysis ; Panneerselvam R., Engineering Economics; James L.RIGGS, Economic Engineering

## BRIDGES

**Introduction** The course deals with concrete bridges as whole structure starting with the history of the bridges, most typical types of bridges, types of constraints and criteria for their overcome. Afterwards are explored the possible static systems and types of cross sections as well, when and which are preferred. In the types of the load are described, which are applied according to EN norms and methods for dimensioning the elements of the bridge.

**Learning outcomes and results:** basic training for designing and calculation principles of the bridge. Learning outcomes: After completing the course the student will be able to identify, understand and make use of the basic elements of a bridge, to inspect the implementation of the project and to design basic bridge.

**Volume and required work time: 3+2, 6 ECTS**

Activity	Hours	Day	Week	Total
Lecture	2		15	30
Theoretical exercise/laboratory	3		15	45
Practical work				
Consultation with the lecturer				10
Field work				5
Midterms, seminars				
Homework				20
Self-study (at the library or at home)				20
Preparations for the final exam				20
Time spent on assessment (tests, quiz, final exam)				8
Projects, presentations, etc.				
Total				168

**Teaching and Learning Methods:** Regular teaching in groups, with individual homework and semester work task as well as visiting the construction site and characteristic already built bridges as well.

**Evaluation Methods and criteria:** Theoretical valuation with tests, seminars and final exams. The practical part with semester elaborates.

**Concretisation tools/TI:** laptop, projector, board and markers

**Ratio between theoretical and practical part**

Theoretical part	Practical part
60%	40%

Basic literature used in this course: Shaban Perjuci: authorised lectures; Jure Radiq: The massive bridges

concrete bridges –