



GRADUATE STUDY: **TRANSPORT**

SEMESTER (III)

Syllabus

Academic year 2023/2024

Course: Evaluation of Road Projects					
Head of course: Assoc. Prof. Danijela Barić, Ph.D.					
Co-lecturers: -					
Semester: III	Course code: 126037	Lectures: 30	Seminar: 10	Laboratory exercises: 20	ECTS credits: 5
Group for lectures: 60 students			Group for laboratory exercises and seminar: 10 students for LE; 20 students for S		

Objective of the course:

- Provide the knowledge and information necessary for systematic understanding of the procedure for evaluating projects in road traffic
- familiarize students with the methodology of preparation and the basic methods of evaluating projects in road traffic. The focus is on presenting the features of selected methods, the possibilities of their specific application and the correct interpretation of the obtained results and the application of appropriate program support.

Learning outcomes:

After the completion of the course the students will be able to:

1. Define basic concepts in the process of investing in road traffic.
2. Select the appropriate method for evaluating projects in road traffic.
3. Calculate the basic indicators in the dynamic approach of road projects evaluation in the cost and benefit analysis method.
4. Evaluate proposed solutions in road traffic by multi-criteria analysis using AHP method.
5. Use program packages in the process of evaluating projects in road traffic: MS Excel for the evaluation of road projects by method of cost and benefit analysis, Expert Choice for road projects evaluation by AHP method, MS project for road projects management in road traffic.
6. Make sensitivity analysis in cost-benefit analysis and AHP methodology.
7. Provide arguable conclusions on the optimal solution based on the results of evaluated projects in road traffic.





LECTURES, LABORATORY EXERCISES and SEMINARS

Week	Syllabus	Form of classes	Performed by	Lessons	Remark
1.	<ul style="list-style-type: none"> Keynote lecture Introduction to the course content, readings, flow diagram for the successful passage through the course Basic concepts 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Introduction of the content of Seminar 	S	Danijela Barić	2	
2.	<ul style="list-style-type: none"> Decision-making process in road transport and traffic Investment in road transport (basic concepts in the investment process, investment, investment decision, investment policy, investment process steps, investor) 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Basic financial calculations: discounting, rebalancing, opportunity cost, simple and complex interest rate, underpayment, periodic payments (numerical calculations using functions in MS Excel) 	LE	Danijela Barić	2	
3.	<ul style="list-style-type: none"> Evaluation of road projects - methodology Planning phases of investment projects in road transport and traffic documentation basis, analysis and synthesis studies (pre-investment study, investment study, performance study) 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Software support for project planning - MS Project 	LE	Danijela Barić	2	



4.	<ul style="list-style-type: none"> Structural preparation of road projects Technical and economic life of the road transport project Technical documentation in the process of evaluating projects in road transport and traffic 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Periodical payments (the numerical calculations using functions in MS Excel) Case study 	LE	Danijela Barić	2	
5.	<ul style="list-style-type: none"> Evaluation of road projects - basic aspects of assessment: financial-market analysis, socio-economic analysis 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Case Study of Road Project - defining problems, purposes and goals, proposition of variants for a new solution 	LE	Danijela Barić	2	
6.	<ul style="list-style-type: none"> Methods for evaluating road projects Evaluation of road projects using the SWOT analysis method 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Case Study of Road Project – creating a SWOT matrix 	LE	Danijela Barić	2	
7.	<ul style="list-style-type: none"> Evaluation of road projects by multi-criteria decision making 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Case Study of Road Project – creating a hierarchical structure of the AHP model Expert Choice – software support for AHP Method 	LE	Danijela Barić	2	
8.	<ul style="list-style-type: none"> Evaluation of road projects by multi-criteria decision making using the Analytical Hierarchy Process method (AHP Method) 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Case Study of Road Project – evaluation of criteria, sub-criteria and alternatives Expert Choice – software support for AHP Method 	LE	Danijela Barić	2	



9.	<ul style="list-style-type: none"> Evaluation of road projects by multi-criteria decision making using the Analytical Hierarchy Process method (AHP Method) 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Case Study of Road Project – choice of optimal alternative; sensitivity analysis Expert Choice – software support for AHP Method 	LE	Danijela Barić	2	
10.	<ul style="list-style-type: none"> Evaluation of road projects using the cost-benefit analysis method (CBA) 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Calculation of CBA parameters in process of road project evaluation (numerical) 	LE	Danijela Barić	2	
11.	<ul style="list-style-type: none"> Indicative dynamic indicators in process of road project evaluation using Cost-benefit analysis method (cost-benefit ratio, internal rate of return, net present value, relative net present value, period of return of investment) 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Calculation of indicative dynamic indicators (CBA) in process of road project evaluation using functions in MS Excel 	LE	Danijela Barić	2	
12.	<ul style="list-style-type: none"> Risk assessment: sensitivity analysis, risk analysis, feedback on the acceptable level of risk assessment, risk prevention 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Sensitivity analysis of road projects Case study – sensitivity analysis for Cost-benefit analysis (CBA) 	S	Danijela Barić	2	
13.	<ul style="list-style-type: none"> Main features of road projects financing Models and sources of road projects financing 	L	Danijela Barić	2	
	<ul style="list-style-type: none"> Case Study of Road Project - recap 	S	Danijela Barić	2	



14.	<ul style="list-style-type: none">▪ Analysis of selected road projects	L	Danijela Barić	2	
	<ul style="list-style-type: none">• Presentation of seminar papers	S	Danijela Barić	2	
15.	<ul style="list-style-type: none">▪ Analysis of selected projects of road infrastructure▪ Recapitulation summary	L	Danijela Barić	2	
	<ul style="list-style-type: none">▪ Presentation of seminar papers	S	Danijela Barić	2	

L = Lectures; AE = Auditory Exercises; LE = Laboratory Exercises; S = Seminars



STUDENT OBLIGATIONS AND EXAMS

Conditions for obtaining signatures:

In order to gain the right to sign, the student should attend at least 70% of the lectures and 70% of the exercises, collect at least 10 points for active participation in the lectures, create a seminar project assignment, and present it.

Written exam:

Written is carried out in two ways:

- a) **in two parts, through two colloquia:** the first colloquium is held halfway through the semester and the other at the end of the semester. The first colloquium can be accessed by all students who are attending classes (min 70%), and the second only students who have passed the first colloquium.
- b) **in one part through a written final exam:** all those students who did not pass both exams or who want to increase the grade are on the written part of the exam.

Oral exam: By the oral part of the exam the student accesses after the created seminar project task, collected at least 10 points in active participation in the teaching and successfully passed both the colloquia or the written final exam.

LITERATURE

a) Obligatory literature:

1. Barić, D.: **Evaluation of road projects - Authorized lectures**, 2018.
(<http://moodle.srce.hr/2018-2019/>)

b) Recommended literature:

1. **Guide to cost-benefit analysis of investment projects (Structural Funds, Cohesion Fund and Instrument for Pre-Accession)**, Final Report, European Commission Directorate General Regional Policy, 2008.
2. Kumares, C. Sinha, Samuel Labi: **Transportation Decision Making: Principles of Project Evaluation and Programming**, John Wiley & Sons, inc., June 2007
3. Rabbani, S. J. L.; Rabbani, S. R.: **Decision in Transportation with the Analytic Hierarchy Process**, UFPB/CCT, Brasil, 1996
4. Saaty, T. L.: **Creative Thinking, Problem solving and Decision Making**, RWS Publications, Pittsburgh, 2006.
5. Vukan R. Vuchic: **Urban Transit: Operations, Planning and Economics**, John Wiley & Sons, inc., 2005.





METHODOLOGY OF THE IMPLEMENTATION OF THE COURSE PLAN

1. LECTURES

Lectures accompanying material exposed in authorized materials (presentations and written templates) in detailed in the required and supplemental literature, and perform combined: the use of a Power Point presentation for the final shape of the model calculations or analysis algorithm, the conditions of application of verbal presentation and explanation of details, and with while further elaboration algorithm procedure and / or computational model calculations on the board. In the lecture, the team encourages discussion of issues that commits.

2. LABORATORY EXERCISES AND SEMINAR

Laboratory exercises and seminars imply solving numerical tasks, work in program packages designed for project evaluation and project design (Expert Choice, MS Excel, MS Project). In the process of evaluating the projects using AHP multi-criteria analysis, the Expert Choice program package is used as program support. MS Excel is used to calculate indicators in a dynamic approach to cost and benefit analysis, and to create a swot matrix in a swot analysis method, and MS Project to plan and monitor project execution dynamics. Students are assigned a seminar project assignment that is self-made with the supervision of the teacher applying the acquired knowledge learned during the lecture. The seminar is performed in a PC classroom in groups of 20 students. Laboratory exercises are held in groups of 10 students.

Note: Individual and/or group viewing negative written test

Individual at the time of consultation or a designated period after each colloquium and / or written exam.





3. DOCUMENTATION

Records of attendance in lectures and exercises, reported topics of seminar project assignments, success of colloquia results, and the created seminar project task are conducted through the Merlin system e-learning system, which also allows for permanent archiving.

4. SCORING SYSTEM

Table 1 The scoring system for the monitoring of students and explained credit values in ECTS credits

no	Segment:	Required credits to be achieved:		Remark:	ECTS credits
		Min.	Max.		
1.	Presence in lectures	5	5	Presence \geq 70%	0,5
2.	Active participation in the lecture	10	20		1
3.	Seminar project assignment	-	15		1
4.	Colloquies (written 2x per semester)	30	50		2
5.	Written exam	30	50	<i>Replacement item 4.</i>	
6.	Oral exam	-	10		0,5
Σ		61	100		5

Assessment and evaluation of student during teaching and on the final exam:

Final evaluation is based on attendance, written exam, compulsory seminar paper and verbal parts of exam





Table 2 - Explanation of the credit values in evaluations

CREDITS:	Estimate based on attendance, seminar paper and two colloquies (or written exam) - [4 ECTS]:	The final score [5 ECTS]:
61 - 70	Sufficient (2)	The final score after oral exam
71 - 80	Good (3)	
81 - 90	Very good (4)	
91 - 100	Excellent (5)	

Information for students (scoring system, implementation plan, learning outcomes, syllabus, literature, consulting teachers, announcement of results of examinations or colloquium, and all other information):

- <https://moodle.srce.hr/2022-2023/>
- <http://www.fpz.unizg.hr>

Student assistants: Additional individual work with the students through individual consultations for assignments from auditory exercises and / or research designs from laboratory exercises, for optional homework, as well as for insight into the negatively written part of the exam.

