Highway Planning - BMEEOUVA-E1

I. Subject Specification

1. Basic Data

1.1 Title

ROAD DESIGN

1.2 Code

BMEEOUVA-E1

1.3 Type

Module with associated contact hours

1.4 Contact hours

Type	Hours/week / (days)
Seminar	2

1.5 Evaluation

Exam

1.6 Credits

3

1.7 Coordinator

name	Dr. Liegner Nándor
academic rank	Professor
email	liegner.nandor@emk.bme.hu

1.8 Department

Department of Highway and Railway Engineering

1.9 Website

https://epito.bme.hu/BMEEOUVA-E1
https://edu.epito.bme.hu/course/view.php?id=4749

1.10 Language of instruction

english

1.11 Curriculum requirements

Compulsory in the Specialization in Infrastructure Engineering (BSc) programme

1.12 Prerequisites

1. Transportation planning

1.13 Effective date

4 September 2023

Highway Planning - BMEEOUVA-E1

2. Objectives and learning outcomes

2.1 Objectives

The aim of the course is to provide the student with the theoretical and practical basics of road design for external and internal areas: the design and coordination of site-planning and longitudinal-planning elements, the technical and technical aspects of each design phase the technical content of the design and the design timeframes, drainage design, environmental design, asphalt road structures design and reinforcement of asphalt pavements, the design of suburban junctions, the calculation of the environmental impact of road traffic, and the integrated planning projects involving several transport modes.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

After successful completion of the course, the student

1. know the commonly used concepts of road design,

2. knows the structure and internal relationships of the design working parts,

3. knows the main relationships between design, geometric and dynamic parameters,

4. knowledge of alignment problems and their solutions,

5. know the relationships for the design of reinforcement of existing asphalt track structures,

6. know the basic relationships for the calculation of environmental effects,

7. knowledge of the basic types of toll collection systems and the basic context of their operation,

8. knowledge of the types of data required for environmental design and how they are processed.

B. Skills

1. be able to prepare road construction work packages for road construction permit plans,

2. be able to calculate and analyse the environmental effects of a planned road,

3. be able to carry out geometric and traffic design of intersections,

4. be able to understand the environmental impact assessment process,

5. be able to analyse the operation of electronic toll systems from a road design point of view,

6. be able to express his/her ideas in an organised way, orally and in writing.

C. Attitudes

1. cooperates with the instructor in the development of knowledge,

2. is open to the professional use of information technology tools,

3. seeks to become familiar with the tools needed for road design problem solving and to use them routinely

4. strive to solve problems accurately and without errors,

5. strive to apply the principles of sustainability and environmental awareness in solving road design problems to apply sustainable and sustainable design

D. Autonomy and Responsibility

1. independently carries out the analysis of road design tasks and problems and, on the basis of given resources, carries out the

solving the problem,

2. is open to well-founded critical comments,

3. applies a systematic approach to thinking.

2.3 Methods

Exercises, written and oral communication, use of IT tools and techniques

2.4 Course outline

1. Planning timeframes, planning traffic, LOS. Plan phases and their parts. Content and work parts of tender and construction plans (layout plan, detailed size and quantity calculation, public utility impact, connections with plans of other disciplines: bridge, drainage)

2. Suburban planning, reconstruction (rural road section strengthening and one-sided widening of the drainage with system correction).

3. Outdoor planning spec. problems: Overtaking stages . The site plan and longitudinal section solutions of the cantilever run-out. Roadway widening in small-radius curves.

4. Different level nodes. Rest areas and service facilities, engineering plants. Parking.

5. Design of other roads (pedestrian path, bicycle path, dirt roads)

6. Urban design, reconstruction. Pavement wind geometry (waving), gate entrances, cycling and pedestrian traffic. Domestic nodes

7. Dewatering of surfaces. Track structure drainage

8. Network planning: Measurement of traffic characteristics. Capacities, performance capabilities. Traffic control/management.

9. Types and elements of expressway junctions. Basic principles, forms of application and details of the design of level junctions

10. Calculation of air pollution caused by road traffic, emission, immission, protection.

11. Calculation of road traffic noise, protection design tools, assessment.

12. Freeway intersections

13, Traffic safety aspects. Design process of an intersection.

14. Electronic toll collection: objectives, requirements, technical-legal-economic background, national and foreign examples, tools, control, methods of toll collection, cost-benefit cost/benefit ratio. Traffic management in suburban areas, intelligent toll collection basic functions of intelligent transport systems.

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

2.5 Study materials

lecture slides on the subject website

2.6 Other information

Attendance at contact hours is 70% compulsory. A student who misses four or more practicals is not may not receive credit for the course.

2.7 Consultation

as indicated on the department's website

This Subject Datasheet is valid for:

2025/2026 semester I

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

learning outcomes are assessed on the basis of two homework assignments and a written exam at the end of the semester

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
Homework	Hw	
Exam	Ex	

The dates of deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

3.3 Evaluation system

Abbreviation	Score
Hw	50%
Ex	50%
Sum	**100%**

3.4 Requirements and validity of signature

To obtain a signature, the total number of qualifications obtained during the period of study according to point 3.3. of the total number of points for the entire period of study.

The semester results in the subject previously obtained, which may be taken into account for the determination of the examination mark, are 3 may be accepted for a period of up to 3 semesters.

3.5 Grading system

Grade	Points (P)
excellent (5)	88-100
good (4)	75-87
satisfactory (3)	63-74
passed (2)	50-62
failed (1)	0-49

3.6 Retake and repeat

Homework can be accepted - after fulfilling payment of the declared late charge - on the week after deadline friday, 23:59 via electronic form.

Submitted homework can be corrected without charge if it is given a "correct and back" sign.

3.7 Estimated workload

Activity	Hours/semester
Lessons	14x2= 28
Preparing for classes	14x2=28
Homework	2x8= 16

Preparing for exam	18
Sum	90

3.8 Effective date

1 September 2023

This Subject Datasheet is valid for:

2025/2026 semester I