Railway Design - BMEEOUVA-E2

I. Subject Specification

1. Basic Data

1.1 Title

Railway Design

1.2 Code

BMEEOUVA-E2

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

0

1.7 Coordinator

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

1.8 Department

Department of Highway and Railway Engineering

1.9 Website

https://epito.bme.hu/BMEEOUVA-E2
https://edu.epito.bme.hu/course/view.php?id=3624

1.10 Language of instruction

english

1.11 Curriculum requirements

[[]]

1.12 Prerequisites

1.13 Effective date

1 September 2023

2. Objectives and learning outcomes

2.1 Objectives

The aim of the course is to provide the student with the theoretical and practical requirements of railway line design.

Know the characteristics of movement, to be able to calculate the details of the geometry of transition curves, to the application of cant transition geometry.

Be able to determine the necessecity of the construction of transition curves and of cant.

Be familiar with the theory required to turnouts, and to the detailed geometrical calculation of the switch section, the intermediate section and the crossing, and the structural design of the turnouts.

Be able to design any individual track connections.

Know the basic concepts of station design.

2.2 Learning outcomes

Upon successful completion of this subject, the student:

A. Knowledge

1. knows the movement characteristics,

2. knows the theory of the geometry of transition curves,

3. knows the geometry of cant transition,

4. knows the theoretical basis for the calculation of geometry of turnouts,

5. is familiar with the structural design of turnouts,

6. knowledge of the theory of calculation of individual track connections,

7. knowledge of the principles of station design.

B. Skills

1. is able to calculate movement characteristics,

2. is able to compute the geometry of the detail points of any transition curve geometry,

3. is able to calculate the details of the geometry of cant transition,

4. be able to determine the need of the application of transition curve and cant,

5. be able to calculate the detailed geometry of turnouts,

6. be able to calculate any individual track connections,

7. design small stations.

C. Attitudes

1. collaborate with the instructor and fellow students in the development of knowledge,

2. expands his/her knowledge through continuous learning,

3. is open to use of information technology tools,

4. strives to learn and routinely use the tools needed to solve problems,

5. strives for accurate and error-free problem solving.

D. Autonomy and Responsibility

1. carries out considerations and designs of railway planning tasks and problem solving independently and on the basis of given resources

2. is open to accept well-founded critical comments,

3. collaborates with fellow students in solving problems in certain situations,

4. applies a systematic approach to thinking and problem solving.

2.3 Methods

1, Lectures, computing exercises, written and oral communication, use of IT tools and techniques,

optional independent tasks, work organisation techniques.

2.4 Course outline

Railway Design - BMEEOUVA-E2

Week	Topics of lectures and/or exercise classes
1.	International railway networks and their connections in Hungary. International regulations and specifications. Regulations of interoperability. International networks and their domestic sections. Main features of the national rail network, line categories. Most important developments.
2.	Movement characteristics: acceleration, changing of acceleration, their practical calculation.
3.	Geometry of a transition curve between a straight and a circular curve.
4.	Geometry of a transition curve between two compound curves. Part 1.
5.	Geometry of a transition curve between reverse curves. Part 2. Calculation of length of transition curves.
6.	Cant and geometry of cant transition. Practical evaluation of curved and connecting track sections, Part 1.
7.	Practical evaluation of curved and connecting track sections, Part 2.
8.	Most important types of turnouts applied in the national railway network.
9.	Calculation of geometry of switch part of a turnout.
10.	Calculation of geometry of intermediate and crossing section of turnouts.
11.	Calculation of geometry of crossings and double slips. Structure of turnuots.
12.	Calculation of track connections, Part 1.
13.	Calculation of track connections, Part 2.
14.	Layout of railway stations, major rules of designing a railway station.

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

1. 1, Dr. Jenő Megyeri: Railway Track Geometry, Technical Publishing, Budapest, 1978.
2. Dr. Nándor Liegner: Railway Design, HEFOP/2004/3.3.1/0001.01

2.6 Other information

1, Attendance at contact hours of 70% is compulsory. A student who misses more classes may not receive credit for the course.

2.7 Consultation

1, As specified on the website of the Department

This Subject Datasheet is valid for:

Inactive courses

II. Subject requirements

Assessment and evaluation of the learning outcomes

3.1 General rules

1, The assessment of the learning outcomes detailed in Chapter 2.2. is based on two mid-term tests, the active participation in the practical exercises (partial assessment) and on one final exam.

3.2 Assessment methods

Evaluation form	Abbreviation	Assessed learning outcomes
1st mid-term test	MT1	A.1 - A.3; B.1 - B.4.
2nd mid-term test	MT2	A.4 - A.6; B.5 - B.6.
Written final exam	Exam	A.1 - A.7; B.1 - B.7;

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
MT1	15%
MT2	15%
Teaching period total	30%
Exam	70%
Sum	**100%**

Mid-term tests and the final exam are unsuccessful if they do not achieve 50% of the available marks.

An examination result below 50% of the available marks will result in a Fail mark.

3.4 Requirements and validity of signature

To obtain a signature, 50% of the
total number of points must be obtained during the teaching period according to
point 3.3.

Mid-term results obtained in previously
semesters of the subject can be taken into account up to three (3) semesters for
the determination of final mark of the the exam.

3.5 Grading system

Grade	Points (P)
excellent (5)	87.5 <= P
good (4)	75 <= P < 87.5%
satisfactory (3)	62.5 <= P < 75%
passed (2)	50 <= P < 62.5%
failed (1)	P < 50%

3.6 Retake and repeat

1. By its nature, active participation cannot be replaced, corrected or otherwise replaced or substituted in any other way.

2. The two mid-term tests may be replaced or corrected free of charge for the first time. In the case of correction, the new result and the previous result shall be taken into account as the one which is more favourable to the student.

3. If the student fails the test according to a retake detailed in Paragraph 2, he or she can take a second attempt to correct the first unsuccessful substitution, subject to the payment of a fee specified in the regulations.

3.7 Estimated workload

Activity	Hours/semester
Participation at contact hours	14×2 = 28
Preparation for the contact hours	14×1 = 14
Preparation for the mid-term tests	2×6+2×3 = 18
Preparation for the exam	30
Sum	90

3.8 Effective date

1 September 2023

This Subject Datasheet is valid for:

Inactive courses