

I. Tantárgyleírás

1. Alapadatok

1.1 Tantárgy neve

DESIGN OF RAILWAY STATIONS

1.2 Azonosító (tantárgykód)

BMEEOUVMSFIN01-00

1.3 Tantárgy jellege

Kontaktórás tanegység

1.4 Óraszámok

Típus	Óraszám / (nap)
Előadás (elmélet)	2

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Vizsga

1.6 Kreditszám

4

1.7 Tárgyfelelős

név	Dr. Fischer Szabolcs
beosztás	Egyetemi docens
email	fischersz@sze.hu

1.8 Tantárgyat gondozó oktatási szervezeti egység

Út és Vasútépítési Tanszék

1.9 A tantárgy weblapja

epito.bme.hu

<https://edu.epito.bme.hu/course/view.php?id=4994>

1.10 Az oktatás nyelve

magyar

1.11 Tantárgy típusa

Kötelező az Infrastruktúra-építőmérnök (MSc) szak Út- és vasútmérnöki specializációján

1.12 Előkövetelmények

1.13 Tantárgyleírás érvényessége

2025. szeptember 1.

2. Céltűzések és tanulási eredmények

2.1 Céltűzések

The aim of the course is to familiarize students with the fundamental principles and advanced concepts in railway station design, including the structural and operational aspects of stations, terminals, and yards. Students will gain an in-depth understanding of turnouts, crossings, and track connections, along with the regulations governing their design and implementation. Special attention will be given to the latest national and international guidelines, emphasizing safety, operational compliance, and sustainable station development. The course will also cover the integration of railway stations into urban transportation networks, exploring multimodal connections and modern technological advancements.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése után a hallgató

A. Tudás

1. is familiar with the geometry of turnouts, including their dimensions, alignment principles, and integration into railway permanent ways, 2. knows the guidelines for designing turnouts, 3. is familiar with the geometrical set-up of standard turnouts, including turnout components, angle calculations, and track transition principles, 4. knows the allocation of turnout sleepers, ensuring proper positioning, load distribution, and long-term track stability, 5. is familiar with the geometrical set-up of double slip turnouts, understanding their structural composition, operational function, and space-saving advantages, 6. knows the common turnout types, including standard, curved, symmetrical, and asymmetrical turnouts, and their applications in railway infrastructure, 7. is familiar with the transport of pre-assembled turnouts, including handling, logistics, and installation procedures to maintain track integrity, 8. knows the design and implementation of (double) track connections with concrete sleepers, 9. is familiar with crossings, including their structural variations, positioning in railway layouts, and integration with other track components, 10. knows the design and application of curved turnouts, considering alignment constraints, 11. is familiar with track connections, their function in railway networks, and their role in facilitating train movement across different track sections, 12. knows the guidelines for designing crossings, ensuring safety, durability, and smooth train transitions at intersections, 13. is familiar with the structural set-up of turnouts, including the materials, construction methods, and engineering principles involved, 14. knows the different types of curved turnouts and their specific uses based on track layout and operational requirements, 15. is familiar with track connections, including mainline junctions, sidings, and specialized configurations for efficient railway operations, 16. knows the general terms related to railway stations, including classifications, operational functions, and infrastructure components, 17. is familiar with the service requirements of railway stations, ensuring proper passenger and freight management, accessibility, and efficiency, 18. knows the technical specifications of railway station design, ensuring compliance with national and international regulations, 19. is familiar with the different types of railway stations, including passenger terminals, freight yards, and multi-functional hubs, 20. knows the process of reconstruction of railway stations, incorporating modern technologies, safety upgrades, and operational improvements, 21. is familiar with the railway service system of large towns, including network planning, service frequency, and possible multimodal integration, 22. knows the design and operational aspects of passenger terminals (yards), ensuring efficient handling of passenger flow and train scheduling – mainly regarding civil engineering aspects, 23. is familiar with the functions of service terminals (yards), including train maintenance, storage, and operational readiness – mainly regarding civil engineering aspects, 24. knows the design and logistics of freight terminals (yards), ensuring smooth cargo handling and transportation efficiency – mainly regarding civil engineering aspects, 25. is familiar with marshalling terminals (yards), including train formation, car sorting, and efficient freight movement strategies – mainly regarding civil engineering aspects.

B. Képesség

1. is able to design and calculate standard and unique track connections with "simple" and curved turnouts between parallel straight tracks, 2. is able to design and calculate standard and unique track connections with "simple" and curved turnouts between parallel tracks in curves (i.e., concentric circular curves), 3. is able to draw various railway service locations at the level of a 'distorted topographical sketch', 4. is able to interpret a computer drawing from a geodetic survey, 5. is able to edit a stationary track geometry (geometries) in the form of a 'distorted topographic sketch' in scale, according to the Hungarian and EU regulations, 6. is able to determine/design the longitudinal section, drainage and cross-sections of a railway station based on its site plan,

7. is able to prepare the work parts belonging to the construction plan (sleeper and rail allocation plan, layout plan), 8. is able to draw and edit using a computer, including the appropriate layout, 9. is able to express his / her thoughts orally and in writing in an orderly form.

C. Attitűd

1. cooperates with the instructor in the preparation of partial evaluations, 2. is open to the use of information technology tools, 3. strives for an accurate and error-free solution, 4. strives for precise, professional wording in its oral and written statements, 5. in its written performance appraisals, he/she strive for orderly quality at the engineering level and for the preparation of visual documentation, 6. in the preparation of plans and drawings, he/she strives for orderly, line thicknesses, appropriate shapes and for transparent work with lettering.

D. Önállóság és felelősség

1. he/she successfully prepares by processing the knowledge material listened to in class, to be able to successfully fulfil the summary evaluations, 2. he/she prepares – independently and to the best of his/her ability – the issued tasks during the independent partial assessments, 3. openly accepts well-founded critical remarks, incorporates them into the solution of his/her tasks.

2.3 Oktatási módszertan

Lectures with presentations, communication in writing and orally: performance appraisal, exam, and active participation in contact classes.

2.4 Részletes tárgyprogram

1. Introduction into design of railway stations 2. Turnouts and crossings I. (basic terms, geometry of turnouts, guidelines for design with turnouts, geometrical set-up of standard turnout) 3. Turnouts and crossings II. (allocation of turnout sleepers, geometrical set-up of double slips, common turnout types, transport of pre-assembled turnouts, (double) track connection with concrete sleepers, crossings) 4. Turnouts and crossings III. (guidelines for design with crossings, structural set-up of turnouts 1.) 5. Turnouts and crossings IV. (structural set-up of turnouts 2.) 6. Track connections I. (curved turnouts) 7. Track connections II. (standard track connections) 8. Calculation of unique track connections I. 9. Calculation of unique track connections II. 10. Railway stations I. (general terms, service of railway stations, technical specifications of design of railway stations) 11. Railway stations II. (types of railway stations 1.) 12. Railway stations III. (types of railway stations 1.) 13. Terminals (railway service system of large towns, passenger terminals, service terminals, freight terminals, marshalling terminals). 14. Reserve week.

A félév közbeni munkaszüneti napok miatt a program csak tájékoztató jellegű, a pontos időpontokat a tárgy honlapján elérhető "Részletes féléves ütemterv" tartalmazza.

2.5 Tanulástámogató anyagok

a) Textbooks 1. Lichtberger, B.: Track compendium, Eurailpress Tetzlaff-Hestra GmbH & Co. Publ., Hamburg, 2005 2. Esveld, C.: Modern railway tracks, MRT Production, Zaltbommel, 2014 3. Mundrey, JS: Railway Track Engineering, 5th Edition, Mc Graw Hill India, 2017 b) Online materials 1. Presentations Fischer, S.: Design of Railway Stations, BUTE, 2025 2. Electronic lecture notes Fischer, S., Eller, B., Kada, Z., Németh, A.: Railway engineering, Universitas-Győr Nonprofit Kft., Győr, 2015

2.6 Egyéb tudnivalók

1) Attendance to lectures is compulsory. The signature and credits from the subject will be refused to students missing more than 4 (i.e., attending less 9 classes). 2) Students are evaluated based on their actual individual performance. Students are required to show evidence of their own knowledge and skills. Submitting a work of others, obtaining or giving unauthorized help (e.g., during an exam or test) cheating and plagiarism in any form is unacceptable. Whoever violate the respective Regulations of the University will be given a failing grade (1), without the possibility of retake and repeat, and will be reported to the Dean's Office.

2.7 Konzultációs lehetőségek

According to the information on the Dept.'s website.

Jelen TAD az alábbi félévre érvényes:

II. Tárgykövetelmények**3. A tanulmányi teljesítmény ellenőrzése és értékelése***3.1 Általános szabályok*

The assessment of the learning outcomes specified in clause 2.2. above and the evaluation of student performance occurs via examination.

3.2 Teljesítményértékelési módszerek

Assessment Name (Type)	Code	Assessed Learning Outcomes
Exam	E	A.1-A.25; B.1-B.9; C.1-C.6; D.1-D.3

A szorgalmi időszakban tartott értékelések pontos idejét, a házi feladatok ki- és beadási határidejét a "Részletes féléves ütemterv" tartalmazza, mely elérhető a tárgy honlapján.

3.3 Teljesítményértékelések részaránya a minősítésben

Code	Weight
E	100%
Total	100%

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

Attendance at 70% of the lectures is compulsory.

3.5 Érdemjegy megállapítása

Grade	Score (P)
excellent (5)	$87 \leq P$
good (4)	$75 \leq P < 87\%$
satisfactory (3)	$62 \leq P < 75\%$
pass (2)	$50 \leq P < 62\%$
fail (1)	$P < 50\%$

3.6 Javítás és pótlás

1. Due to its nature, active participation cannot be replaced or improved. 2. Exams can be repeated in accordance with the Study and Examination Regulations.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

Activity	Hours/Semester
contact hours	$14 \times 2 = 28$
continuous preparation for the lectures	$14 \times 2 = 28$
preparation for the examination	64

3.8 A tárgykövetelmények érvényessége

2025. szeptember 1.

Jelen TAD az alábbi félévre érvényes: