

I. Tantárgyleírás

1. Alapadatok

1.1 Tantárgy neve

Reinforced Concrete Structures

1.2 Azonosító (tantárgykód)

BMEEOHSAT43

1.3 Tantárgy jellege

Kontaktórák tanegység

1.4 Óraszámok

| Típus | Óraszám / (nap) |
|-------------------|-----------------|
| Előadás (elmélet) | 3 |

1.5 Tanulmányi teljesítményértékelés (minőségi értékelés) típusa

Félévközi érdemjegy

1.6 Kreditszám

3

1.7 Tárgyfelelős

| | |
|----------|------------------------------------------------------------------------|
| név | István Völgyi |
| beosztás | Egyetemi docens |
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1.8 Tantárgyat gondozó oktatási szervezeti egység

Hidak és Szerkezetek Tanszék

1.9 A tantárgy weblapja

<https://epito.bme.hu/BMEEOHSAT43>

<https://edu.epito.bme.hu/course/view.php?id=450>

1.10 Az oktatás nyelve

magyar és angol

1.11 Tantárgy típusa

Kötelező az építőmérnöki (BSc) szakon

1.12 Előkövetelmények

Strong prerequisites:

- Introduction to Strength of Materials (BMEEOTMAT42)
- Basis of Design (BMEEOHSAT41)

Weak prerequisites:

- Construction Materials I. (BMEEOEMAT43)

1.13 Tantárgyleírás érvényessége

2020. szeptember 1.

2. Célkitűzések és tanulási eredmények

2.1 Célkitűzések

The aim of the subject is to acquire the basis of structural reinforced concrete design. Simple structural members and slabs subjected to simple and complex forces will be discussed in serviceability limit states and ultimate limit states.

2.2 Tanulási eredmények

A tantárgy sikeres teljesítése utána a hallgató

A. Tudás

1. knowing the terms and notations of reinforced concrete design,
2. knowing the behaviour and modelling of reinforced concrete material,
3. knowing the design principles of reinforced concrete (RC) cross sections,
4. knowing the typical behaviour modes of RC cross sections,
5. knowing the methods of verification and design.

B. Képesség

1. one is able to verify and design simple RC members subjected to shear, bending, torsion, eccentric compression and combination of them.
2. one is able to verify and design one way RC slabs,
3. one is able to verify and design RC beams,
4. one is able to verify and design RC columns subjected to eccentric compression and combined forces.
5. one is able to analyse elements of complex structures,
6. one is able to solve complex problems using the knowledge in informatics,
7. one is able to express his thought in written and oral form.

C. Attitűd

1. one shows interest in traditional and modern tools and methods.
2. one aims to get acquainted with and apply methods for problem solving.
3. one aims to solve problems precisely.

D. Önállóság és felelősség

1. One uses system approach.

2.3 Oktatási módszertan

Lectures and exercise classes. Communication in oral and written form, application of IT tools and methods. Project for single student (or for groups, optional).

2.4 Részletes tárgyprogram

| Week | Topics of lectures and/or exercise classes |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Deflection of RC members. |
| 2. | Behaviour of RC cross sections subjected to bending (I and II. behaviour phase). |
| 3-5. | Behaviour of RC cross sections subjected to bending III. behaviour phase; design, verification, beams, slabs). + test |
| 6-8. | Behaviour of RC cross sections subjected to shear (formulae, important parameters). |
| 9-10. | Verification of RC members subjected to combined forces (bending + shear, shift of bending moment diagram, verification of end support, torsion). + test |
| 11-12. | Verification of cross section and member subjected to eccentric compression. |
| 13. | Basic idea of prestressing. |
| 14. | Drawing technics + test |

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) Online materials:

1. Electronic notes: <http://edu.epito.bme.hu/mod/folder/view.php?id=8396>
2. EN 1990, EN 1991, EN 1992
3. Martin, Purkiss: Concrete design to EN1992. Elsevier. 2006.
4. Mosley, Bungey, Hulse: Reinforced Concrete Design to Eurocode 2.

2.6 Egyéb tudnivalók

1. Visit of contact classes is obligatory. Absence <30% is accepted.

2.7 Konzultációs lehetőségek

The instructors are available for consultation during the lecture and occasionally during their office hours, as advertised on the department website.

Jelen TAD az alábbi félévre érvényes:

2024/2025 semester I

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 tests and homework project (HW) assignments.

Date of tests and deadlines for the HW: see the website of the subject.

3.2 Teljesítményértékelési módszerek

| Evaluation form | Abbreviation | Assessed learning outcomes |
|---------------------------------------------------|--------------|-------------------------------------|
| 1. midterm test (summary evaluation) | T1 | A.1-A.5; B.1-B.2, B.7; C.1-C.2; D.1 |
| 2. midterm test (summary evaluation) | T2 | A.1-A.5; B.2-B.3, B.7; C.1-C.2; D.1 |
| 3. midterm test (summary evaluation) | T3 | A.1-A.5; B.4-B.5, B.7; C.1-C.2; D.1 |
| 1-3. homework | HW1-3 | A.1-A.5; B.4-B.6, B.7; C.1-C.3; D.1 |
| attendance and activity (optional; positive only) | A | A.1-A.5; B.5, B.7; D.1 |

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

| Abbreviation | Score |
|--------------|-------------------------------------------------------------------------------------------|
| T1-3 | 82% (82 points) (average of the best two tests; test has practical and theoretical parts) |
| HW1-3 | 18% (18 points) |
| A | 10% (10 points) |
| Sum | 100%+10% |

Average of the best two theoretical part of the tests should be >40%.

Average of the best two tests (practical + theoretical) should be >50%.

Total result should be >50%.

Attendance should be >70%.

Best two theoretical and best two test (theoretical + practical) can be chosen separately. For example best two theoretical part: first and second, best two test: first and third.

If the requirement for the test is fulfilled after the second test, bonus can be realised if the result of the third test is above 50%. The bonus is the 10% of the third best test (max 8.2 points). For example: if the individual test results are 90%; 70%; 80%, bonus is $82 \text{ points} * 10\% * 70\% = 5.74$ points. If the individual test results are 90%; 70%; 40%, bonus is 0.

There is no individual requirement for the HW. (If the test requirement is fulfilled, but the test result is close to minimum, additional HW points are necessary.)

3.4 Az aláírás megszerzésének feltétele, az aláírás érvényessége

The subject is passed if the student meets the requirements detailed in part 3.3.

3.5 Érdemjegy megállapítása

If the subject is passed, the grade is calculated the following way:

| Grade | Points (P) |
|---------------|-------------|
| excellent (5) | $90 \leq P$ |

| | |
|------------------|--------------------|
| good (4) | $75 \leq P < 90\%$ |
| satisfactory (3) | $60 \leq P < 75\%$ |
| passed (2) | $50 \leq P < 60\%$ |
| failed (1) | $P < 50\%$ |

3.6 Javítás és pótlás

1. There is no minimum requirement for individual mid-term benchmarking, therefore retake of the tests is not possible.
2. The HW is part of the systematic learning. There is no late submission. The method of the solution is shown after the deadline.
3. No retake of attendance and activity is available.

3.7 A tantárgy elvégzéséhez szükséges tanulmányi munka

| Activity | Hours/semester |
|--------------------------------------|-----------------------|
| contact hours | $13 \times 3 = 39$ |
| preparation for the courses | $14 \times 2 = 28$ |
| preparation for the tests (homework) | $7 + 8 + 8 = 23$ |
| Sum | 90 |

3.8 A tárgykövetelmények érvényessége

2021. szeptember 1.

Jelen TAD az alábbi félévre érvényes:

2024/2025 semester I