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|---|---------------|------------------|-----------------------------|------|
| Budapest University of Technology and Economics<br>FACULTY OF ARCHITECTURE<br>DEPARTMENT OF MECHANICS, MATERIALS AND STRUCTURES |               |                  |                             |      |
| Subject:<br><b>DESIGN OF REINFORCED CONCRETE STRUCTURES</b>   |               |                  | Code:<br><b>BMEEPST0655</b> |      |
| Evaluation form   | Credit points | Educational year | Semester                    | Year |
| Midsemester mark  | 2             | 2017/2018        | 1st                         |      |
| Lecturer: Dr. András Draskóczy  |               |                  |                             |      |

## TOPICS SCHEDULE

| Week No. | Date           | LECTURES<br>Thursdays 13.15-15.00 K363   |  |  |
|----------|----------------|--|--|--|
| 1        | 09. 07.2017    | 1 Introduction. General design and construction problems of reinforced concrete structures. <b>Cross-section design</b> of linear and planar members in <b>ultimate limit state</b> (ULS). Check of the <b>serviceability limit states</b> (SLS). Some historic rc buildings, Requirements at present.   |  |  |
| 2        | 14. 09.        | 2 <b>Reinforcement systems</b> of rc structural members. Content and preparation techniques of <b>execution projects</b> . The art of detailing on the example of projects of <b>P.L.Nervi</b> .   |  |  |
| 3        | 21. 09.        | 3 Design problems of r.c. <b>foundations, columns and walls</b> . Impermeable space limitations. <b>Fire resistance</b> design of rc structures. Distribution of study topics  |  |  |
| 4        | 28. 09.        | Construction site visit  |  |  |
| 5        | 05. 10.        | 4 Design and construction problems of the <b>Palace of Arts of Budapest</b> (MŰPA). Invited lecturer: Eng. <b>Ferenc Gonda</b> (Dékettő Co. Ltd.)  |  |  |
| 6        | 12. 10.        | <b>1<sup>st</sup> test (45 Minutes)</b><br>Continuation of the 3 <sup>rd</sup> lecture   |  |  |
| 7        | 19. 10.        | Preliminary project week (no lectures will be given)   |  |  |
| 8        | 26. 10.        | <b>5 The Groupama football stadium Budapest and other current projects</b> . Invited lecturer: Pál Miklán, structural engineer   |  |  |
| 9        | 02. 11.        | <b>6 Impacts of modern concrete technologies</b> on architectural design of reinforced concrete structures.  |  |  |
| 10       | 9. 11.         | <b>7 Approximate design of dimensions of rc structures</b> . Rc <b>cantilevers</b> used as architectural motifs. Some design problems of monolithic rc floor structures: <b>variable slab thickness, bubble deck slab, pre-stressed rc slabs</b> with bounded and unbounded tendons. <b>Bracing systems</b> of rc load-bearing structures. <b>Tilted rc structures</b> |  |  |
| 11       | 16. 11.        | Student scientific conference  |  |  |
| 12       | 23. 11.        | <b>8 Fabric formed concrete</b> . Decorative concrete. Invited lecturer: <b>Dr István Sajtos</b> head of Dept. of Mechanics, Materials and Structures  |  |  |
| 13       | 30. 11.        | <b>2nd test (45 Minutes)</b><br><b>9 Joints and accessories</b>  |  |  |
| 14       |                | Design project elaboration week  |  |  |
| 15       | 11 and 12. 12. | <b>Test repetition of tests 1 and 2</b>  |  |  |

# REQUIREMENTS

|                                    |  |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
|------------------------------------|--|------------------|-------------|----------|--|--------------|----------|--|---------------|------------------|--|----------------|----------|--|----------------|---------------|
| <b>Conditions of inscription:</b>  | -Inscription through the Neptun system until 1st of Sept.  |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
| <b>Character of the lessons:</b>   | Lectures, site visit, tests  |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
| <b>Prescriptions for presence:</b> | According to Code of Study and Exams, presence on on 70% of the lectures is obligatory (3 absences are allowed )   |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
| <b>Midsemester controls</b>        | Two tests, valuing 120 points max. each<br>One common test repetition to make up for one missed test or to improve the result of the worse one.  |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
| <b>Scheduled study submission</b>  | Study on a reinforced concrete structure constructed during the last decades, valueing 20 to 40 points must be submitted meeting some content and formal requirements (see separated). Final date of submission: 8th of Dec. at 12.00 a.m. Passing this deadline means losing the semester. Requirements prescribed for the educational period can not be recovered during the examination period. Consultation possibilities during weekly reception hours. |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
| <b>Conditions of fulfilment:</b>   | <ol style="list-style-type: none"> <li>1. Submission and acceptance of the study</li> <li>2. Min. 60 points of both tests</li> <li>3. <b>Min. 60 points mean of the tests</b></li> </ol>   |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
|                                    |  |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
|                                    |  |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
| <b>Final mark:</b>                 | <table style="width: 100%; border: none;"> <tr> <td style="width: 15%;">Final mark:</td> <td style="width: 35%;">0-79 points</td> <td style="width: 50%;">fail (1)</td> </tr> <tr> <td></td> <td>80-95 points</td> <td>pass (2)</td> </tr> <tr> <td></td> <td>96-111 points</td> <td>satisfactory (3)</td> </tr> <tr> <td></td> <td>112-127 points</td> <td>good (4)</td> </tr> <tr> <td></td> <td>128-160 points</td> <td>excellent (5)</td> </tr> </table> | Final mark:      | 0-79 points | fail (1) |  | 80-95 points | pass (2) |  | 96-111 points | satisfactory (3) |  | 112-127 points | good (4) |  | 128-160 points | excellent (5) |
| Final mark:                        | 0-79 points  | fail (1)         |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
|                                    | 80-95 points   | pass (2)         |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
|                                    | 96-111 points  | satisfactory (3) |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
|                                    | 112-127 points   | good (4)         |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
|                                    | 128-160 points   | excellent (5)    |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |
| <b>Test repetition</b>             | Unsuccessful test results can be improved once<br>Improving the final mark is possible according to the Code of Study and Exam.  |                  |             |          |  |              |          |  |               |                  |  |                |          |  |                |               |

Obligatory literature:

Deák – Draskóczy – Dulácska – Kollár – Visnovitz: Reinforced Concrete Design Aids, 2011.

Lecture notes (available at: [www.szt.bme.hu/download/english\\_courses/design\\_of\\_reinforced\\_concrete\\_structures/2017](http://www.szt.bme.hu/download/english_courses/design_of_reinforced_concrete_structures/2017))

Recommended literature:

P.L. Nervi: Aesthetics and Technology in Building, London, Oxford Univ. Press, 1966

A. Pauser: Beton im Hochbau, Verlag Bau + Technik GmbH, Düsseldorf, 1998