**SYLLABUS**

1. **Information about the program**

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| **1.1** Higher education institution |  UNIVERSITATEA POLITEHNICA TIMISOARA  |
| **1.2** Faculty[[1]](#footnote-1) / Department[[2]](#footnote-2) |  CONSTRUCTII / CCI+CMMC  |
| **1.3** Field of study (name/code[[3]](#footnote-3)) |  INGINERIE CIVILA / 10  |
| **1.4** Study cycle | Master  |
| **1.5** Study program (name/code/qualification) |  ADVANCED DESIGN OF BUILDINGS – PROIECTAREA AVANSATA A CLADIRILOR / 10 / Master  |

1. **Information about discipline**

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| **2.1** Name of discipline/The educational classe[[4]](#footnote-4) | Rehabilitation and Retrofitting of Buildings - Reabilitarea și Consolidarea Clădirilor / DA  |
| **2.2** Coordinator (holder) of course activities |  Conf. dr. ing. Sorin-Codruț FLORUȚ, Prof. dr. ing. Viorel UNGUREANU  |
| **2.3** Coordinator (holder) of applied activities[[5]](#footnote-5) |  Conf. dr. ing. Sorin-Codruț FLORUȚ  |
| **2.4** Year of study[[6]](#footnote-6) |  1  | **2.5** Semester |  2  | **2.6** Type of evaluation |  E  | **2.7** Regime of discipline[[7]](#footnote-7) |  DI  |

1. **Total estimated time** (direct activities (fully assisted), partially assisted activities and unassisted activities[[8]](#footnote-8))

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| **3.1** Number of hours fully assisted/week |  4 ,of which:  | course |  2  | seminar/laboratory/project |  2  |
| **3.1\*** Total number of hours fully assisted/sem. |  56 ,of which:  | course | 28  | seminar/laboratory/project |  28  |
| **3.2** Number of on-line hours fully assisted/sem |  18 ,of which:  | course | 12  | seminar/laboratory/project |  6  |
| **3.3** Number of hours partially assisted/week |  0 ,of which:  | project, research |  0  | training |  0  | hours designing M.A. dissertation |  0  |
| **3.3\*** Number of hours partially assisted/ semester |  0 ,of which:  | project of research |  0  | training |  0  | hours designing M.A. dissertation |  0  |
| **3.4** Number of hours of unassisted activities/ week |  6.71 ,of which:  | Additional documentation in the library, on specialized electronic platforms, and on the field | 1  |
| Study using a manual, course materials, bibliography and lecture notes | 2  |
| Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays |  3.71  |
| **3.4\*** Total number of hours of unasssited asctivities/ semester |  94 ,of which:  | Additional documentation in the library, on specialized electronic platforms, and on the field |  14  |
| Study using a manual, course materials, bibliography and lecture notes |  28  |
| Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays |  52  |
| **3.5 Total hrs./week**[[9]](#footnote-9) |  10.71  |
| **3.5\* Total hrs./semester** |  150  |
| **3.6 No. of credits** |  6  |

**4. Prerequisites** (where applicable)

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| **4.1** Curriculum | * Strength of materials; Static alaysis; Beton; Reinforced concrete structures; Dynamics of structures and earthquake engineering; Steel structures
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| **4.2** Competencies | *
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**5. Conditions** (where applicable)

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| **5.1** of the course | * Medium capacity room, video projector
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| **5.2** to conduct practical activities | * Medium capacity room, video projector, computers
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**6. Specific competencies** acquired through this discipline

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| Specific competencies | * Compatibility and performance evaluation of various strengthening and rehabilitation systems for reinforced concrete, masonry, steel and timber structures
* Analysis and design of strengthening systems for various reinforced concrete, masonry, steel and timber structural systems
* Behaviour evaluation of rehabilitated structures.
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| Professional competencies ascribed to the specific competencies | * ensure compliance with security legislation; provide instructions to staff; adhere to legal regulations; develop feasibility studies; supervise construction projects; provide construction counseling; apply health and safety standards; use measuring tools; draw sketches; utilize CAD software; manage engineering projects; draft technical reports; apply numerical computing skills; supervise personnel; conduct sample analysis; adapts existing projects to new circumstances; evaluates the integrated design of buildings;
 |
| Transversal competencies ascribed to the specific competencies | * manage financial and material resources; oversee quality control; apply scientific, technological, and engineering knowledge; work in teams; train others; use equipment, tools, or technological equipment accurately
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**7. Objectives of the discipline** (based on the grid of specific competemcies acquired)

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| **7.1** The general objective of the discipline | * After completing the course, the student must be able to estimate/identify/propose optimal rehabilitation solutions for certain structural systems, including being able to evaluate their performance through computational models.
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| **7.2** Specific objectives | * Students learn to use advanced computational models, in accordance with the specific Eurocodes for the design of structures, for the evaluation of the performance of rehabilitation systems and rehabilitated structures.
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**8. Content**

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| **8.1** Course | Number of hours | Of which online | Teaching methods |
|  Durability and causes of concrete degradation  |  2  |  Max 60%  |  Presentation on the blackboard, with video projector, conversations, explanations, examples  |
|  Maintenance and repair of concrete and masonry elements  |  2  |   |
|  Strengthening of reinforced concrete structures through jacketing with reinforced concrete and metallic elements  |  2  |   |
|  Strengthening of reinforced concrete structures by modifying the structural systeml |  2  |   |
|  Use of fiber reinforced polymer composite materials for strengthening reinforced concrete, masonry, and timber structures  |  4  |   |
|  Rehabilitation and strengthening of masonry structures using reinforced mortars and reinforced concrete jacketing  |  2  |   |
|  Strengthening of steel structures  |  14  |   |
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|   |   |   |
|  | Bibliography[[10]](#footnote-10) *fib* bulletin No. 103. Guide for Strengthening of Concrete Structures. Guide for good practice (316 pages, ISBN 978-2-88394-158-8, May 2022)European Standard EN 1504:2004 - Products and systems for the protection and repair of concretestructuresP 100/3-2019 - Cod de proiectare seismică - Partea III - Prevederi pentru evaluarea seismică a clădirilor existenteGP 079-2014 - Ghid privind proiectarea și execuția consolidării structurilor în cadre din beton armat cu pereți turnați in situNewman A, Structural Renovation of Buildings: Methods, Details, and Design Examples, McGraw-Hill, 2001Floruț SC, Note de curs - Prezentări powerpoint  |
| **8.2** Applied activities[[11]](#footnote-11) | Number of hours | Of which online | Teaching methods |
|  Evaluation and strengthening of a masonry structure through reinforced concrete jacketing, reinforced plasters, FRCM, CRM, FRP  |  4  |  Max 35% |  Presentation on the blackboard, with video projector, on the computer, conversations, explanations, examples  |
|  Strengthening of reinforced concrete elements using fiber reinforced polymer composite materials - Calculation examples |  6  |   |
|  Strengthening a reinforced concrete frame structure through reinforced concrete jacketing |  8  |   |
|  Strengthening a reinforced concrete frame structure using cast-in-situ walls |  6  |   |
|  Evaluation and strengthening of timber elements  |  4  |   |   |
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|   |   |   |   |
|  | Bibliography[[12]](#footnote-12) *fib* bulletin No. 103. Guide for Strengthening of Concrete Structures. Guide for good practice (316 pages, ISBN 978-2-88394-158-8, May 2022)European Standard EN 1504:2004 - Products and systems for the protection and repair of concretestructuresP 100/3-2019 - Cod de proiectare seismică - Partea III - Prevederi pentru evaluarea seismică a clădirilor existenteGP 079-2014 - Ghid privind proiectarea și execuția consolidării structurilor în cadre din beton armat cu pereți turnați in situNewman A, Structural Renovation of Buildings: Methods, Details, and Design Examples, McGraw-Hill, 2001Floruț SC, Note de curs - Prezentări powerpoint  |

**9. Coroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program**

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| * The graduate will be able to design strengthening systems and evaluate the performance of rehabilitated structures
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**10. Evaluation**

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| Type of activity | **10.1** Evaluation criteria[[13]](#footnote-13) | **10.2** Evaluation methods | **10.3** Share of the final grade |
| **10.4** Course |  2 theoretical topics  |  Written examination  | 40%  |
| **10.5** Applied activities  | **S:** 1 - calculation application for strengthening structural elements.1 - application for strengthening a reinforced concrete frame structure.  |  Written examination, Submitting reports for aplications  | 60%  |
|  | **L:**   |   |   |
|  | **P:**   |   |   |
|  | **Pr:**   |   |   |
|  | **Tc-R[[14]](#footnote-14):**  |   |   |
| **10.6** Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified[[15]](#footnote-15) |
| * The final mark must accumulate a minimum score of 5 points out of 10 possible
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| **Date of completion** | **Course coordinator****(signature)** | **Coordinator of applied activities****(signature)** |
|   |  Conf.dr.ing. Sorin-Codruț FLORUȚ......................................................Prof.dr.ing. Viorel UNGUREANU.......................................................  |  Conf.dr.ing. Sorin-Codruț FLORUȚ......................................................  |

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| **Head of Department** **(signature)**  | **Date of approval in the Faculty Council [[16]](#footnote-16)** | **Dean****(signature)** |
|  CCI - Prof.dr.ing. Sorin DAN......................................................CMMC - Prof.dr.ing. Aurel STRATAN.......................................................  |   |  Prof.dr.ing. Raul ZAHARIA......................................................  |

1. The name of the faculty which manages the educational curriculum to which the discipline belongs [↑](#footnote-ref-1)
2. The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs. [↑](#footnote-ref-2)
3. The code provided in HG - on the approval of the Nomenclature of fields and specializations / study programs, annually updated. [↑](#footnote-ref-3)
4. The educational classes of disciplines are: thoroughgoing study discipline (DA), advanced knowledge discipline (DCAV), synthesis discipline (DS) or complementary discipline (DC). [↑](#footnote-ref-4)
5. The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr). [↑](#footnote-ref-5)
6. The year of study to which the discipline is provided in the curriculum . [↑](#footnote-ref-6)
7. Discipline may have one of the following regimes: imposed discipline (DI) or compulsory discipline (DOb)-for the other fundamental fields of studies offered by UPT or optional discipline (DO). [↑](#footnote-ref-7)
8. Within UPT, the number of hours from 3.1\*, 3.2\*,…,3.9\* are obtained by multipling by 14 (weeks) the number of hours from 3.1, 3.2,…, 3.9. [↑](#footnote-ref-8)
9. The total number of hours/week is obtained by summing up the number of hours from 3.1, 3.4 şi 3.8. [↑](#footnote-ref-9)
10. At least one title must belong to the department staff teaching the discipline, and at least one title must refer to a relevant work for the discipline, a national and international work that can be found in the UPT Library. [↑](#footnote-ref-10)
11. The types of applied activities are those mentioned in 5. If the discipline containes more types of applied activities then they are marked, consecutively, in the table below. The type of activity will be marked distinctively under the form: „Seminar:”, „Laboratory:”, „Project:” and/or „Practice/Training:”. [↑](#footnote-ref-11)
12. At least one title must belong to the staff teaching the discipline. [↑](#footnote-ref-12)
13. The Syllabus must contain the evaluation method of the discipline, specifying the criteria, the metods and the forms of evaluation, as well as mentioning the share attached to these within the final mark. The evaluation criteria must correspond to all activities stipulated in the curriculum (course, seminar, laboratory, project), as well as to the methods of continuous assessment (homework, essays etc.) [↑](#footnote-ref-13)
14. Tc-R= Homework-Reports [↑](#footnote-ref-14)
15. For this point turn to “Ghid de completare a Fișei disciplinei” found at: <http://www.upt.ro/img/files/2018-2019/calitate/Ghid_de_completare_fisa_disciplinei.pdf> [↑](#footnote-ref-15)
16. The approval is preceeded by discussing the study program’s board’s point of view with redgards to the syllabus. [↑](#footnote-ref-16)