**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/ 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) | | | Fire design of buildings - Proiectarea cladirilor la actiunea focului/ DS | | | | |
| **2.2** Coordinator (holder) of course activities | | | Prof. dr. ing. Raul ZAHARIA, Sl. dr. ing. Dan PINTEA | | | | |
| **2.3** Coordinator (holder) of applied activities[[5]](#footnote-5) | | | S.l. dr. ing. Dan PINTEA | | | | |
| **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 | 3.5 ,of which: | course | 2 | seminar/laboratory/project | | | 1.5 |
| **3.1\*** Total number of hours fully assisted/sem. | 49 ,of which: | course | 28 | seminar/laboratory/project | | | 21 |
| **3.2** Number of on-line hours fully assisted/sem | 23 ,of which: | course | 16 | seminar/laboratory/project | | | 7 |
| **3.3** Number of hours partially assisted/week | ,of which: | project, research |  | training |  | hours designing M.A. dissertation |  |
| **3.3\*** Number of hours partially assisted/ semester | ,of which: | project of research |  | training |  | hours designing M.A. dissertation |  |
| **3.4** Number of hours of unassisted activities/ week | 5.43 ,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 | | | | | 2.43 |
| **3.4\*** Total number of hours of unasssited asctivities/ semester | 76 ,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 | | | | | 48 |
| Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays | | | | | 34 |
| **3.5 Total hrs./week**[[9]](#footnote-9) | 8.93 | | | | | | |
| **3.5\* Total hrs./semester** | 125 | | | | | | |
| **3.6 No. of credits** | 5 | | | | | | |

**4. Prerequisites** (where applicable)

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| **4.1** Curriculum |  |
| **4.2** Competencies |  |

**5. Conditions** (where applicable)

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| **5.1** of the course | * Medium capacity room, video projector |
| **5.2** to conduct practical activities | * Medium capacity room, video projector, computers |

**6. Specific competencies** acquired through this discipline

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| Specific competencies | * Understanding the calculation methods from the specific Eurocode standards, for the fire design of buildings. Advanced finite element analysis for fire design of buildings |
| Professional competencies ascribed to the specific competencies | * ensure compliance with security legislation; provide instructions to staff; adhere to legal regulations; provide construction counseling; apply health and safety standards; draw sketches; utilize CAD software; manage engineering projects; draft technical reports; apply numerical computing skills; supervise personnel; evaluates the integrated design of buildings; manage data in the field of research; prepares scientific reports; |
| Transversal competencies ascribed to the specific competencies | * oversee quality control; apply scientific, technological, and engineering knowledge; work in teams; train others; |

**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 determine the fire resistance of structural elements in accordance with specific Eurocodes, also by applying advanced computational models, using the finite element method |
| **7.2** Specific objectives | * Students learn to use simplified calculation methods but also advanced calculation models, using the finite element method, in accordance with the specific Eurocodes for the fire design of buildings. Students also learn to model the fire action considering both nominal curves and advanced curves: parametric fire, localized fires, and the two-zone model. |

**8. Content**

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| **8.1** Course | | Number of hours | Of which online | Teaching methods |
| Introduction to Fire Design of Buildings | | 2 | Max 60% | Presentation on the blackboard, with video projector, conversations, explanations, examples |
| Mechanical action in case of fire. Thermal action | | 2 |  |
| Design of buildings in fire situation using simplified calculation models within specific Eurocodes, applied for the standard fire curve | | 10 |  |
| Advanced fire curves: parametric fire, localized fires, two-zone model | | 4 |  |
| Advanced calculation models for thermal analysis of structural elements | | 5 |  |
| Advanced Computational Models for Mechanical Analysis of Structures in fire situation | | 5 |  |
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|  | Bibliography[[10]](#footnote-10) Franssen JM, Zaharia R, Design of steel structures subjected to fire, Les editions de l’Universite de Liege, ISBN 10: 2-87456-027-8, ISBN 13: 9782874560279, 2006  Franssen JM, V. Kodur, Zaharia R - Designing Steel Structures for Fire Safety - CRC Press Taylor & francis Group – Balkema, London, UK, ISBN 978-0-415-54828, 2009  Standard calculation methods for structural fire protection, American Society of Civil Engineers Society of Fire Protection Engineers, ASCE Standard 29, ISBN : 0-7844-0649-9, 2003  SAFIR: A thermal/structural program for modeling structures under fire, JM Franssen, Engineering Journal-American Institute of Steel Construction Inc 42 (3), 143-158  User’s manual for SAFIR 2011 a computer program for analysis of structures subjected to fire, JM Franssen, University of Liege, Belgium.  A tool to design steel elements submitted to compartment fires—OZone V2. Part 1: pre- and post-flashover compartment fire model, J-F. Cadorin, J-M. Franssen, Fire Safety Journal, Volume 38, Issue 5, September 2003, Pages 395–427  A tool to design steel elements submitted to compartment fires—OZone V2. Part 2: Methodology and application, J-F. Cadorin, D. Pintea, J-C. Dotreppe, J-M. Franssen, Fire Safety Journal, Volume 38, Issue 5, September 2003, Pages 429–451 | | | |
| **8.2** Applied activities[[11]](#footnote-11) | | Number of hours | Of which online | Teaching methods |
| Thermal analysis of structural elements in the fire situation using simplified calculation models within specific Eurocodes, applied for the standard fire curve | | 4 | Max 35% | Presentation on the blackboard, with video projector, on the computer, conversations, explanations, examples |
| Mechanical analysis of structural elements in the fire situation using simplified calculation models within specific Eurocodes, applied for the standard fire curve | | 6 |  |
| Modeling of the advanced fire curves using OZone program | | 2 |  |
| Thermal analysis of structural elements in the fire situation using the SAFIR program, for standard fire curve and advanced fire curves | | 4 |  |
| Mechanical analysis of structures in the fire situation using the SAFIR program | | 5 |  |  |
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|  | Bibliography[[12]](#footnote-12) Franssen JM, Zaharia R, Design of steel structures subjected to fire, Les editions de l’Universite de Liege, ISBN 10: 2-87456-027-8, ISBN 13: 9782874560279, 2006  Franssen JM, V. Kodur, Zaharia R - Designing Steel Structures for Fire Safety - CRC Press Taylor & francis Group – Balkema, London, UK, ISBN 978-0-415-54828, 2009  Standard calculation methods for structural fire protection, American Society of Civil Engineers Society of Fire Protection Engineers, ASCE Standard 29, ISBN : 0-7844-0649-9, 2003  SAFIR: A thermal/structural program for modeling structures under fire, JM Franssen, Engineering Journal-American Institute of Steel Construction Inc 42 (3), 143-158  User’s manual for SAFIR 2011 a computer program for analysis of structures subjected to fire, JM Franssen, University of Liege, Belgium | | | |

**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 determine the fire resistance of structural elements in accordance with the specific Eurocodes |

**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:** one application using simplified methods from specific Eurocodes, and one application with the use of the SAFIR program | Written examination, Application on computer | 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)** |
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| **Head of Department**  **(signature)** | **Date of approval in the Faculty Council [[16]](#footnote-16)** | **Dean**  **(signature)** |
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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)