# SYLLABUS [1]

## 1. Information about the program

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| **1.1** Higher education institution | Politehnica University Timişoara |
| **1.2** Faculty[2]/ Department [3] | Faculty of Civil Engineering/ Department of Steel Structures and Structural Mechanics - CMMC |
| **1.3** Chair | — |
| **1.4** Field of study (name/code[4]) | Civil engineering/80 |
| **1.5** Study cycle | Bachelor |
| **1.6** Study program (name/code/qualification) | Civil engineering ( in English)/ 10/ Engineer |

## 2. Information about the discipline

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|---|---|---|---|---|---|---|---|
| **2.1** Name of discipline/ formative category[5] | | | Mechanics | | | | |
| **2.2** Coordinator (holder) of course activities | | | Prof.dr.ing. Raul Zaharia | | | | |
| **2.3** Coordinator (holder) of applied activities[6] | | | Lect.dr.ing. Ioan Both | | | | |
| **2.4** Year of study[7] | I | **2.5** Semester | 2 | **2.6** Type of evaluation | E | **2.7** Type of discipline[8] | DI |

## 3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) [9]

| | | | | | |
|---|---|---|---|---|---|
| **3.1** Number of fully assisted hours / week | 4 of which: | **3.2** course | 2 | **3.3** seminar / laboratory / project | 2 |
| **3.1*** Total number of fully assisted hours / semester | 56 of which: | **3.2*** course | 28 | **3.3*** seminar / laboratory / project | 28 |
| **3.4** Number of hours partially assisted / week | of which: | **3.5** training | | **3.6** hours for diploma project elaboration | |
| **3.4*** Total number of hours partially assisted / semester | of which: | **3.5*** training | | **3.6*** hours for diploma project elaboration | |
| **3.7** Number of hours of unassisted activities / week | 2.5 of which: | additional documentary hours in the library, on the specialized electronic platforms and on the field | | | 0.5 |
| | | hours of individual study after manual, course support, bibliography and notes | | | 1 |
| | | training seminars / laboratories, homework and papers, portfolios and essays | | | 1 |
| **3.7*** Number of hours of unassisted activities / semester | 35 of which: | additional documentary hours in the library, on the specialized electronic platforms and on the field | | | 7 |
| | | hours of individual study after manual, course support, bibliography and notes | | | 14 |
| | | training seminars / laboratories, homework and papers, portfolios and essays | | | 14 |
| **3.8 Total hours / week** [10] | 6.5 | | | | |
| **3.8* Total hours /semester** | 91 | | | | |
| **3.9 Number of credits** | 4 | | | | |

## 4. Prerequisites (where applicable)

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| **4.1** Curriculum | • Mathematics |
| **4.2** Competencies | • Mathematical operations |

[1] The form corresponds to the Discipline File promoted by OMECTS 5703 / 18.12.2011 and to the requirements of the ARACIS Specific Standards valid from 01.10.2017.
[2] The name of the faculty which manages the educational curriculum to which the discipline belongs
[3] The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.
[4] The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.
[5] Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).
[6] Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
[7] Year of studies in which the discipline is provided in the curriculum.
[8] Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).
[9] The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.
[10] The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

**5. Conditions** (where applicable)

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|---|---|
| **5.1** of the course | • Classroom of medium capacity |
| **5.2** to conduct practical activities | • Classroom of medium capacity |

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

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|---|---|
| Specific competencies | • Learn fundamental notions of classical mechanics, including statics, kinematics and dynamics |
| Professional competencies ascribed to the specific competencies | • Recognizing typical structures and structural elements, specific to the graduated study programme<br>• Design of structural elements in civil engineering, specific to graduated study programme |
| Transversal competencies ascribed to the specific competencies | • Documentation in Romanian and foreign language, in view of professional and personal development, via continuous learning and efficient adaptation to the new technical specifications |

**7. Objectives of the discipline** (based on the grid of specific competencies acquired - pct.6)

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|---|---|
| **7.1** The general objective of the discipline | • The discipline aims to provide the students with fundamental knowledge of Newtonian mechanics, including the topics of statics, kinematics and dynamics. The course contains the fundamental notions of classical mechanics that are used further in the “Mechanics of materials” and “Structural analysis” courses |
| **7.2** Specific objectives | • After completion of the course, the student should be able to calculate the geometrical characteristics of cross-sections, to compute the reactions of a given statically determined structure, to determine the axial forces within a truss, to determine the displacements within a plane mechanism and to apply the principle of virtual work |

**8. Content** [11]

| **8.1** Course | Number of hours | Teaching methods [12] |
|---|---|---|
| 1. Introduction. 2. A little bit of history 3. Basic notions and principles of theoretical mechanics | 2 | Lectures, conversations, explanations, examples |
| 4. Statics 4.1 Statics of the particle 4.2 Statics of the rigid body 4.3. Statics of systems of rigid bodies | 8 | |
| 4.4 Geometrical characteristics of the cross-sections for linear elements | 4 | |
| 4. 5. Trusses | 2 | |
| 5. Kinematics 5.1 Kinematics of the particle 5.2 Kinematics of the rigid body | 4 | |
| 6. Dynamics 6.1 Priciples 6.2 Dynamics of the particle 6.3 Dynamics | 4 | |

[11] It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".
[12] Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

| | | |
|---|---|---|
| of the systems of particles | | |
| 7. Principle of virtual work apllied in the analysis of civil engineering structures 7.1 Plane mechanisms with 1 DOF 7.2 Principle of virtual work applied in the Structural Analysis | 4 | |
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Bibliography [13] Dragulescu D., Toth-Tascau M., Mecanica, Ed. Orizonturi Universitare, Timisoara, 2002

Ilie G., Fierbinteanu V., Stanila N., Petrescu I., Mecanica Constructiilor, Editura tehnica, Bucuresti, 1987

Hangan S., Iordanescu M., Ghermanescu M., Mecanica Constructiilor, Editura Didactica si pedagogica, Bucuresti, 1975

Feynman R., Leighton R., Sands M., Feynman Lectures on Physics: The Definitive and Extended Edition, Publisher Addison Wesley, 2005

Hibbler R. C., Engineering Mechanics: Statics and Dynamics, 11th Edition, Peason Prentice Hall, 2006

McLean W. G., Nelson E. W., Engineering Mechanics, McGraw-Hill Book Company, Second edition, 1962

| **8.2** Applied activities [14] | Number of hours | Teaching methods |
|---|---|---|
| 1. Dimensions, quantities and units of measurement<br>2. Operations with vectors | 4 | Examples, conversations, explanations, comparative analysis |
| 3. Equilibrium of a particle<br>4. Equivalent force system<br>5. Couple of forces | 4 | |
| 6. Static equilibrium for a plane structure (Types of forces, reactions, Simple supported beam, Cantilever, Calculation of internal forces in trusses | 8 | |
| 7. Geometric properties of simple and composed Cross-sections (Centre of gravity, First moment of area, Second moment of area, Polar moment of inertia, Product of inertia of a cross-section, Position of principal axis | 6 | |
| 8. Circular motion | 2 | |
| 9. Plane parallel motion. Motion of a rigid solid body with a fixed point | 2 | |
| 10. Application of the virtual work principle in the computation of the reactions for a statically determinate structure | 2 | |
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Bibliography [15] Dragulescu D., Toth-Tascau M., Mecanica, Ed. Orizonturi Universitare, Timisoara, 2002

Ilie G., Fierbinteanu V., Stanila N., Petrescu I., Mecanica Constructiilor, Editura tehnica, Bucuresti, 1987

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Hibbler R. C., Engineering Mechanics: Statics and Dynamics, 11th Edition, Peason Prentice Hall, 2006

McLean W. G., Nelson E. W., Engineering Mechanics, McGraw-Hill Book Company, Second edition, 1962

**9. Corroboration 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**

[13] At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.
[14] Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".
[15] At least one title must belong to the discipline team.

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| • The graduates must have knowledge about the fundamental Newtonian Mechanics |

**10. Evaluation**

| Type of activity | **10.1** Evaluation criteria [16] | **10.2** Evaluation methods | **10.3** Share of the final grade |
|---|---|---|---|
| **10.4** Course | Applications and theoretical subjects | Written examination | 50 % |
| **10.5** Applied activities | **S:** | | 40 % |
| | **L:** Solving the problems in the corresponding tests during semester activity | Tests and presentation of the homeworks, responses to the questions during the seminars | |
| | **P**[17]**:** | | |
| | **Pr:** Students are expected to attend and participate in every class session | The attendance is monitored | 10% |
| **10.6** Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [18]) | | | |
| • The answers to the exam subjects 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)** |
| 25.01.2018 | …… | …… |
| **Head of Department (signature)** | **Date of approval in the Faculty Council [19]** | **Dean (signature)** |
| …… | 12.02.2018 | …… |

[16] Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)

[17] In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.

[18] It will not explain how the promotion mark is awarded.

[19] The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.