## *Course title: STATICS OF STRUCTURES I*

| *Course code* | *Course status* | *Semester* | *Number of ECTS credits* | *Number of classes* |
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| | *Mandatory* | *V* | *7* | *3P+1V+2L* |

***Study programs for which it is organized:*** Bachelor studies – Study program Civil engineering, duration 6 semesters and 180 ECTS credits.

***Conditionality to other subjects:*** Strength of materials I, Strength of materials II, Mathematics II

***Course study objectives:*** Acquiring knowledge in the field of statics of line structures

***Learning outcomes:*** After passing this exam the student will be able to:
1. Understand the theoretical foundations of the linear theory of elasticity of line structures in plane,
2. Apply the procedures for determining the static determination and kinematic stability of line structures in plane,
3. Apply classical methods to determine: reactions, forces and displacements of statically determined structures in plane,
4. Understand the procedures for determining the deformation lines of line structures in plane,
5. Understand the concept of influential lines and methods for determining influential lines for static and kinematic influences of statically determined girder, frame and truss, structures in plane,
6. Apply the force method for the calculation of reactions and internal forces for statically indeterminate line structures in plane,
7. Understand procedures for determining displacements in statically indeterminate line structures in plane.

***Name and surname of professor and teaching assistant:*** ***Dr Marina Rakočević, Vasilije Bojović***

***Teaching and learning methods:*** Lectures, practise, elaborate, consultations, additional classes and consultations before the final exam, colloquia, final exams.

***Course content:***

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| 1st week of course | Basic equations of technical theory of a member in a plane. |
| 2nd week of course | Integrals of equilibrium conditions of a members, expressions for internal forces. Integrals of deformation equations, expressions for displacements and rotations. Relations of statically independent values and deformation values of a beam. |
| 3rd week of course | Elements and nodes of structures. Basic equations and basic unknown values. Kinematic and static classification of structures. |
| 4th week of course | The principle of virtual forces and the principle of virtual displacements. Moving load, influential lines and their application. |
| 5th week of course | Statically determined structures. Decomposition method. |
| 6th week of course | Influence lines of statically determined girders and frames - static method. |
| 7th week of course | Trusses, reactions and internal forces. Influence lines for reactions and internal forces - static method. |
| 8th week of course | Determination of reactions and internal forces using the principle of virtual displacements. Coplanar movement in plane. Influence lines for reactions and internal forces - kinematic method. |
| 9th week of course | Determination of generalized displacements. Determination of displacement diagrams of statically determined structures. |
| 10th week of course | *COLLOQUIUM I* |
| 11th week of course | Determination of displacement diagrams of statically determined trusses. Reciprocity theorems. Construction of influential lines for deformation influences. |
| 12th week of course | Force method - Introduction, static indeterminacy, adoption of the basic system - primary structure, derivation of equilibrium equations. |
| 13th week of course | Force method - Internal forces, displacements, influence lines. |
| 14th week of course | Symmetrical frames. Continuous girders. |
| 15th week of course | *COLLOQUIUM II* |

***Student obligations during course:*** Attendance at lectures and practises, making elaborate, taking a colloquium and final exam.

**STUDENT WORKINGLOAD**

| **Weekly** | **During the semester** |
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| **7 credits x40/30=9 hours and 20 min**<br><br>**Structure:**<br>**3** hours of lectures<br>**3** hours of practise<br>**3** hours and **20** minutes individual work including consultations | **Lectures and final exam**: 16x (9 hours and 20 min)**=149 hours i 20 min**<br>**Necessary preparations before the beginning of the semester** (administration, enrollment, certification):<br>2x (9 hours and 20 min)=**18 hours and 40 min**<br><br>**Total workingload for course: 7x30=210 hours**<br><br>**Additional work** for exam preparation in the remedial exam period, including taking the remedial exam from 0 to 42 hours (remaining time from the first two items to the total workload for the course 135 hours)<br>**Workingload structure:**<br>149 h and 20 min (lect.)+18 h and 40 min (prep.) + 42 h (additional work)=210h |

***Literature:*** Đurić: Statika konstrukcija, Građevinska knjiga,1979., M. Đurić, D. Nikolić: Statika konstrukcija- uticaj pokretnog opterećenja, Naučna knjiga Beograd, 1983., S. Ranković: Statika konstrukcija, Naučna knjiga Beograd,1986., Other literature in the field of statics of structures from foreign publishers

***Forms of exams and grading:***
The knowledge test is performed continuously during the semester and at the final exam. The maximum student can earn 50 points during the semester. The following is evaluated:

- Elaborate from 4,0 to 10,0 points
- Colloquia 2x (from 9,0 to 20,0) points
- Final exam from 22 to 50,0 points

Elaborate: The student is obliged to regularly work elaborate tasks according to the established program.
At the colloquia, the theoretical part of the exam is taken orally / in writing, with the stated minimum and maximum number of points.
At the final exam, tasks are taken in writing with the stated minimum and maximum number of points.
A passing grade is obtained when at least 50 points are earned.

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| ***Special notes for the course:*** |
| ***Name and surname of the professor who prepared the data:*** ***Dr Marina Rakočević*** |
| ***Note:*** Additional information about the subject can be obtained from the course lecturer, teaching assistant, head of the study program and vice dean. |