

Bridges & Civil Engineering Structures

Code: MK3TAR4S4SX17-EN

ECTS Credit Points: 4 credits

Evaluation: exam grade

Year, Semester: 4th year, 7th semester

Its prerequisite(s): Steel structures, Reinforced concrete structures, Geotechnics III.

Further courses are built on it: No

Number of teaching hours/week (lecture + practice): 4+0

Topics:

History of bridges. Bridges classes. Norms and preliminary works. Foundations, substructures and equipment. Dilatations. Structure and building techniques of steel bridges. Steel beam bridges. Steel frame, arch and suspension bridges. Orthotropic plates. Structure and building techniques of concrete bridges. Concrete beam, frame and arch bridges. Prestressing techniques. Precast pretensioned girder bridges. Concrete box girders. Structures and building techniques of cable-stayed bridges. Composite and timber bridges. Test loading, monitoring and maintenance and strengthening techniques. Reservoirs, bunkers water-towers.

Literature:

Compulsory:

- M. J. Ryall, G. A. R. Parke, J. E. Harding (2000): The Manual of Bridge Engineering, Thomas Telford
- H. G. Tyrrell (2008): History of Bridge Engineering; Stubbe Press

Recommended:

- fib Bulletin N° 39. Seismic bridge design and retrofit - structural solutions. State-of-art report (300 pages, ISBN 978-2-88394-079-6, May 2007).
- fib Bulletin N° 32. Guidelines for the design of footbridges. Guide to good practice (160 pages, ISBN 978-2-88394-072-7, November 2005).
- fib Bulletin N° 30. Acceptance of stay cable systems using prestressing steels. Recommendation (80 pages, ISBN 978-2-88394-070-3, January 2005)
- fib Bulletin N° 29. Precast concrete bridges. State-of-art report (84 pages, ISBN 978-2-88394-069-7, November 2004).
- fib Bulletin N° 9. Guidance for good bridge design. Part 1 – Introduction. Part 2 – Design and construction aspects. Guide to good practice (190 pages, ISBN 978-2-88394-049-9, July 2000).

Schedule

1st week Registration week	
2nd week: Lecture: History of bridges. Bridges classes.	3rd week: Lecture: Norms and preliminary works.
4th week: Lecture: Foundations, substructures and equipment. Dilatations.	5th week: Lecture: Structure and building techniques of steel bridges. Steel beam bridges.
6th week: Lecture: Steel frame, arch and suspension bridges. Orthotropic plates.	7th week: Study trip
8th week: 1st drawing week / 1st test	
9th week:	10th week:

Lecture: Structure and building techniques of concrete bridges. Concrete beam, frame and arch bridges.

11th week:

Lecture: Structures and building techniques of cable-stayed bridges. Composite and timber bridges.

13th week:

Lecture: Reservoirs, bunkers water-towers.

15th week: 2nd drawing week / 2nd test

Lecture: Prestressing techniques. Precast pretensioned girder bridges. Concrete box girders.

12th week:

Lecture: Test loading, monitoring and maintenance and strengthening techniques.

14th week:

Study trip

Requirements

Attendance at **lectures** is **compulsory**. Students must attend the lectures and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't make up a lecture with another group. Attendance at lectures will be recorded by the staff of the department. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Missed lectures should be made up for at a later date, to be discussed with the tutor. Students are required to bring a calculator and the printed materials of the lectures to each lecture. Active participation is evaluated by the teacher in every class. Students' active participation is required.

A, for a signature:

Students have to **submit all the two tests** as scheduled minimum at a sufficient level. During the semester there are two tests – the 1st test in the 8th week and the 2nd test in the 15th week. In order to gain the **signature**, minimum point of tests has to be taken (min. 40 points from 60 points).

B, for a grade:

In order to take an **exam grade** – minimum (2) pass grade – minimum point of tests (min. 40 points from 60 points) and exam points (min. 21 points from 40 points) has to be taken (Summa minimum 61 points from 100 points). The minimum and the maximum points related to the tests and design tasks can be obtained are the follows:

Two tests:

1. Test:	Maximum:	30 points	Minimum:	20 points
2. Test:	Maximum:	30 points	Minimum:	20 points
	Summa:	60 points		40 points

Points required for signature:

Maximum:	60 points	Minimum:	40 points
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Exam:

Maximum:	40 points	Minimum:	21 points
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Summa points:

Maximum:	100 points	Minimum:	61 points
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The course ends with an **exam grade**. Based on the summa points of the tests and the summa point of the exam, the exam grade is defined according to the following calculation:

Score	Grade
0-60 = fail; 61-70 = pass (2); 71-80 = satisfactory (3); 81-90 = good (4); 91-100 = excellent (5).	