Bridges and Structures

Code: MK5TAR1S3TX17-EN

ECTS Credit Points: 3

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1st semester

Its prerequisite(s): -

Further courses are built on it: No

Number of teaching hours/week (lecture + practice): 2 + 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:

Required:

- 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:	3rd week:
Lecture: History of bridges. Bridges classes.	**Lecture:** Norms and preliminary works.
4th week:	5th week:
Lecture: Foundations, substructures and equipment. Dilatations.	**Lecture:** Structure and building techniques of steel bridges. Steel beam bridges.
6th week:	7th week:
Lecture: Steel frame, arch and suspension bridges. Orthotropic plates.	Study trip.

8th week: 1st drawing week	
9th week:	**10th week:**
Lecture: Structure and building techniques of concrete bridges. Concrete beam, frame and arch bridges.	**Lecture:** Prestressing techniques. Precast pretensioned girder bridges. Concrete box girders.
11th week:	**12th week:**
Lecture: Structures and building techniques of cable-stayed bridges. Composite and timber bridges.	**Lecture:** Test loading, monitoring and maintenance and strengthening techniques.
13th week:	**14th week:**
Lecture: Reservoirs, bunkers water-towers.	Study trip.
15th week: 2nd drawing week / Test / Presentations	

Requirements

Participation at **lectures** is **compulsory**. A student has to attend lectures and may not miss more than three lectures during the semester. In case a student misses more than three, the subject will not be signed and the student must repeat the course. 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. Students are required to bring calculator and the printed materials of the lectures with them to each lecture. Active participation is evaluated by the teacher in every class. Active student's participation should be required. Students have to **submit the test and the presentation** as scheduled minimum on a sufficient level.

A, for a signature:

A student has to reach at least 40 points from the 60 points on the test and at least 21 points from the 40 points on presentation. The presentation has to be handed in personally. One will get questions about the presentation on it.

B, for mid-semester grade:

The course ends with mid-semester grade. Based on the summa points of the test and the presentation, the mid-semester grade is defined in the following way:

Test:	Maximum:	**60 points**	Minimum:	**40 points**
Homework:	Maximum:	**40 points**	Minimum:	**21 points**
Summa points:	Maximum:	**100 points**	Minimum:	**61 points**

Score / grade: 0 – 60 points: fail (no signature); 61 – 70 points: pass (2); 71 – 80 points: satisfactory (3); 81 – 90 points: good (4); 91 – 100 points: excellent (5)