COURSE DESCRIPTION

Theme of the course
We propose to explore the interaction between geometry and mechanical behaviour of structural systems where the shape of the structure has strong effect on its efficiency. In particular, we will study the basic construction principles of cables, arches and other structures, which are carry their loads via normal forces (tension or compression).
We will apply this knowledge in an architectural design project. The students will design an open-air theatre in Budapest (close to the University on ‘Kopaszi’ dam) with emphasis on the interplay between attractive form, functional values and efficient structural behaviour.

Progress throughout the semester
The course will be held in a workshop style. Students' work will be accompanied by consultants of both departments. Students will have to complete their tasks in groups of 2-3 students.
Thus in the beginning of the course students will get familiar with the tasks and the site in form of presentations and site visits. They also get acquainted with examples, possible structural systems, technologies and possible solutions.

The development/progress of their projects will be presented by the students in form of three open presentations during the seminars. These presentations will be immediately evaluated by the consultants who will discuss the work in public. As the design process goes on students have to document related inspiring buildings, conceptual layout of the environment of the building and its interior and detailed plans of the building with emphasis on the applied structural systems and their geometry.

The seminars not only provide space to collective consultations and presentations but also contain the consultant’s phase-specific presentations which shall improve the development of the work.

The classroom K 222 is available for the students all day on Monday and Wednesday. Note that the door is not locked and other students use the class room on other days. Please arrive no later than at is in the schedule. You will listen to each other's presentations on every Wednesday. Monday is for consultations, lectures and workshops.
Four main phases form the basic structure of the course:

Analysis – discovering the characteristics of the site: history, layers, development plans, etc. Each group will get a specific topic and will prepare a short presentation.

Architectural program: sketch of suggested new functions of the whole area, and detailed program for the building.

Architectural plans – architectural behaviour, interpreting the context: building and landscape design. A full documentation of an architectural intervention will be developed in scale 1:200 or 1:100.

Structural plans – the loadbearing structures will be developed without performing detailed calculations. Nevertheless, approximate dimensions will be determined through simple calculations, and the geometric arrangements of structural elements will be designed carefully in scale 1:200 or 1:100.

Participants

The course Project Design is run by two departments: the Department of Mechanics, Materials and Structures and the Department of Industrial and Agricultural Building Design. Students’ work will be accompanied by consultants of both departments.

Lecturers responsible: István BARTÓK DLA, Dr Péter VÁRKONYI

Consultants: Department of Industrial and Agricultural Building Design
– István BARTÓK DLA, Dávid SZABÓ

in cooperation with: Department of Mechanics, Materials and Structures
– Dr Péter VÁRKONYI, Dr Tamás THER, Orsolya GÁSPÁR

<table>
<thead>
<tr>
<th>HALF SEMESTER COURSE 1</th>
<th>Credits: 8</th>
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<td>FORM FOLLOWS FORCE</td>
<td>in cooperation with</td>
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<tr>
<td></td>
<td>Dept. of Industrial and Agricultural Building Design and Dept. of Mechanics, Materials and Structures</td>
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Tutors: István BARTÓK DLA
Dr Péter VÁRKONYI
Dr Tamás THER
Dávid SZABÓ

Responsible: István BARTÓK DLA

Way of training:
Practical interdisciplinary design course – Lectures, team consultations, common presentations and evaluation in English – according to the timetable
**TIMETABLE AND TOPIC SCHEDULE**
Mondays 9:15 AM - 5 PM, Wednesdays 9:15 PM - 5 PM in room K 222

<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Wednesday</th>
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Students’ short introduction  
Introductory lectures by instructors. Setting up the teams with 2-3 students and topics of preliminary study. |
consultation with both departments | **11:15** STRUCTURAL DESIGN WORKSHOP + FORM FINDING LECTURE  
organized by T. Ther & O. Gáspár |
| 10. 05. and 07. Nov. | **12:15** CONSULTATION with both departments | **11:15** STUDENT PRESENTATION of concept design |
consultation with both departments | Day off |
consultation with both departments |
| 14. 03. and 05. Dec. | **12:15** CONSULTATION with both departments (please show us work-in-progress state of your final presentation materials) | **10:15** FINAL STUDENT PRESENTATION of completed projects |

**Program**
The design task is to plan an open air theater at Kopaszi dam, near the bay. The middle scale building’s capacity is 150 person. The auditoria, lobby, circulation and service areas need to be calibrated for these capacity. The theater can be entirely or just partly (stage) covered by roof structure, it will depend on the architectural concept. The goal is to design a well functioning layout with an expressive covering structure.

<table>
<thead>
<tr>
<th>Area</th>
<th>Size (m²)</th>
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<tbody>
<tr>
<td>entrance / lobby</td>
<td>100m²</td>
</tr>
<tr>
<td>pay-desk</td>
<td>15m²</td>
</tr>
<tr>
<td>cafeteria</td>
<td>20m²</td>
</tr>
<tr>
<td>lavatories</td>
<td>50m²</td>
</tr>
<tr>
<td>auditoria</td>
<td>for 150 person</td>
</tr>
<tr>
<td>stage</td>
<td>100m²</td>
</tr>
<tr>
<td>backstage</td>
<td>100m²</td>
</tr>
<tr>
<td>lobby</td>
<td>20m²</td>
</tr>
<tr>
<td>changing room</td>
<td>50m²</td>
</tr>
<tr>
<td>changing rooms</td>
<td>4x 20m²</td>
</tr>
</tbody>
</table>
storages 3x 20m2
scenery storage 60 m2
kitchenette 30 m2
rest room 20 m2

conditions:
- accepted presentation of preliminary study of site analysis and inspiring examples
- accepted presentation of concept design (architectural program, architectural floor plans, section, 1:200, mock-up and perspective view of the structural system with materials and approximate dimensions)
- accepted presentation of structural form finding
- accepted presentation of final design project plans, (architectural floor plans, section, elevations 1:200/100, structural floor plans, sections 1:200/100, site plan 1:1000/500, and mock-up illustrating structural systems and architectural form 1:200/100/50)
- active presence during the semester (70% of classes)

deadline: Wednesday, 5th of December, Presentation starts at 10:15 AM

grading:
The final grade will be established as the result of the personal and team work of the student in class and at home. The submissions, presentations and class work will be graded according to the following:
concept design: 15 %
structural plans: 20 %
activity during semester workshops: 15 %
final submission and presentation: 50 %

grades:
0-49 % failed (1)
50-62 % passed (2)
63-75 % satisfactory (3)
76-89 % good (4)
90-100 % excellent (5)

20th October 2018.

Dr Péter Várkonyi      István Bartók DLA
associate professor     associate professor
Department of Mechanics,      Department of Industrial
Materials and Structures     and Agricultural Building Design