<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Polytechnic graduate professional study programme specialization in Civil Engineering obligatory courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mr.sc. Branimir Preprotić dipl. inž. stroj. Asset Management ECTS:5.0</td>
</tr>
<tr>
<td></td>
<td>Pred. Ida Popčević prof. Communication Skills ECTS:5.0</td>
</tr>
<tr>
<td></td>
<td>dr.sc. Sonja Zlatović dr. prof.v.šk. Quality Management ECTS:5.0</td>
</tr>
<tr>
<td></td>
<td>dr.sc. Mandi Orlić Bachler prof. mat. i inf. Probability and Statistics ECTS:3.0</td>
</tr>
<tr>
<td></td>
<td>mr.sc. Petra Gracin mr.sc. Petar Adamović prof.v.škole Project Management ECTS:5.0</td>
</tr>
<tr>
<td>Semester 2</td>
<td>Polytechnic graduate professional study programme specialization in Civil Engineering obligatory courses</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>doc.dr.sc. Dalija Kuvačić profesor visoke škole Economics and Management ECTS: 5.0</td>
</tr>
<tr>
<td></td>
<td>prof.vis.šk. Boris Baljkas Engineering Buildings ECTS: 6.0</td>
</tr>
<tr>
<td></td>
<td>doc. dr. sc. Dean Ćizmar dipl. ing. grad. Dr.sc. Krunoslav Pavković dipl.ing.grad.</td>
</tr>
<tr>
<td></td>
<td>Josip Ćengija Construction Project Management ECTS: 6.0</td>
</tr>
<tr>
<td></td>
<td>mr.sc. Petar Adamović prof.v.škole</td>
</tr>
<tr>
<td></td>
<td>mr.sc. Gorana Ćosić-Flajsig viši predavač</td>
</tr>
<tr>
<td></td>
<td>dr. sc. Sanja Morić predavačica Environmental Management ECTS: 6.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polytechnic graduate professional study programme specialization in Civil Engineering elective courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>v.predavač Boris Uremović dipl.ing.grad. Modern Construction Technologies ECTS: 7.0</td>
</tr>
<tr>
<td>dr.sc. Igor Gukov , dipl.ing.grad. Bridges ECTS: 5.0</td>
</tr>
<tr>
<td>Zlatko Milanović Solid Waste Disposals ECTS: 6.0</td>
</tr>
<tr>
<td>dr.sc. Dražen Arbutina dipl.ing.arh. Public and Industrial Buildings ECTS: 10.0</td>
</tr>
<tr>
<td>Ljiljana Matuško Antonić Business Ethics and Law ECTS: 5.0</td>
</tr>
<tr>
<td>Zlatko Milanović Solid Waste Disposals ECTS: 6.0</td>
</tr>
<tr>
<td>Semester 3</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Name and Details</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Stjepan Kordek dipl.ing.grad.</td>
</tr>
<tr>
<td>Mr. sc. Gorana Ćosić-Flajsig viši predavač</td>
</tr>
<tr>
<td>Dr. sc. Ivan Vučković dipl.ing.biologije</td>
</tr>
<tr>
<td>Mr. sc. Gorana Ćosić-Flajsig viši predavač dr. sc. Mladen Petričec dipl.ing.grad.</td>
</tr>
</tbody>
</table>
### Semester 4

<table>
<thead>
<tr>
<th>Polytechnic graduate professional study programme specialization in Civil Engineering obligatory courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nositelj predmeta nije poznat</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polytechnic graduate professional study programme specialization in Civil Engineering elective courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nositelj predmeta nije poznat</td>
</tr>
</tbody>
</table>
Semester 6
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>21887/63923</th>
<th>ECTS</th>
<th>5.0</th>
<th>Academic year</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Asset Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>1st semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching mode</td>
<td>Lectures + exercises (auditory + laboratory + seminar + methodology + construction) at home</td>
<td>30+15 (9+0+6+0)</td>
<td>105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td>Lectures: mr.sc. Branimir Preprotić dipl. inž. stroj.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Auditory exercises: mr.sc. Branimir Preprotić dipl. inž. stroj.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Auditory exercises: Bojan Sabolić</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seminar exercises: mr.sc. Branimir Preprotić dipl. inž. stroj.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seminar exercises: Bojan Sabolić</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course objectives</td>
<td>Students will acquire competencies enabling successful management of material assets or equipment (technical and other systems).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning outcomes:</td>
<td>1. manage financial assets. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. manage material assets. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. manage human resources. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. prepare strategic plan for a company. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. define an optimum life-cycle asset management plan. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. organise structure of an asset management system. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. develop an asset management system. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. select an asset management tool option. Level:7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. recommend an asset management methodology. Level:7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. estimate reliability of a system. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out lectures</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Giving lectures in a traditional way can be accompanied with presentations on OHP or in the Power Point by using LCD projector or other presentations enabling better understanding of the topics presented (photos, flow charts of realization of Asset Manager process in different environments).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out auditory exercises</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out seminars</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students visit a company where all the elements of an Asset Management process can be observed and, with assistance of their teacher, students prepare the seminar.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course content lectures</td>
<td>1. Introductory lecture on company assets with a special review of the content of material assets and of basic asset management trends, 2h, Learning outcomes:1,2,3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Basic terms and definitions on asset management. Presentation and detailed description of the asset management process, 2h, Learning outcomes:2,4,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Approaches and concepts relating to maintenance systems, and selection of appropriate maintenance strategies, 2h, Learning outcomes:4,5,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Approaches and concepts relating to maintenance systems, and selection of appropriate maintenance strategies, 2h, Learning outcomes:1,2,3,6,10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Measurement of key parameters that define the ability of carrying out works on a particular material assets, or equipment, 2h, Learning outcomes:3,4,5,7,9,10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Measurement of key parameters that define the ability of carrying out works on a particular material assets, or equipment, 2h, Learning outcomes:2,4,7,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Measurement of key parameters that define the ability of carrying out works on a particular material assets, or equipment, 2h, Learning outcomes:5,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Determination of key indicators for successful asset management, comparison with similar companies (benchmarking), 2h, Learning outcomes:3,6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Evaluating life cycle of equipment (technical systems); different cost determination effects and cost structure during the life cycle of the equipment, 2h, Learning outcomes:3,4,5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Evaluating life cycle of equipment (technical systems); different cost determination effects and cost structure during the life cycle of the equipment, 2h, Learning outcomes:6,7,8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Two recent and most significant approaches for maintenance system management and their relations (TPM and RCM), 2h, Learning outcomes:8,9,10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. Two recent and most significant approaches for maintenance system management and their relations (TPM and RCM), 2h, Learning outcomes:8,9,10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13. Two recent and most significant approaches for maintenance system management and their relations (TPM and RCM), 2h, Learning outcomes:8,9,10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14. Conclusive remarks on asset management trends, future studies and possible solutions, 2h, Learning outcomes:4,5,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15. Conclusive remarks on asset management trends, future studies and possible solutions, 2h, Learning outcomes:4,5,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course content auditory</td>
<td>1. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes:1,2,3,4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes:1,2,3,4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes:5,6,7,8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes: 5, 6, 7, 8

5. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes: 7, 8, 9, 10

6. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes: 7, 8, 9, 10

7. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes: 1, 3, 5, 7, 9, 10

8. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes: 3, 5, 7, 9, 10

9. In the course of these exercises students will solve problems using different parameter measurement examples from practice, which will be prepared by the assistant. The data calculated, i.e. the results obtained will be used for interpreting equipment management situation, benchmarking, and for anticipating activities needed for successful management of these processes., 1h, Learning outcomes: 1, 3, 5, 7, 9, 10

10. no classes, 1h

11. no classes, 1h

12. no classes, 1h

13. no classes, 1h

14. no classes, 1h

15. no classes, 1h

### Course content

<table>
<thead>
<tr>
<th>Seminars</th>
<th>1. no classes, 1h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>3. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>4. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>5. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>6. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>7. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>8. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>9. no classes, 1h</td>
</tr>
<tr>
<td></td>
<td>10. Visit to a representative company where all the elements of an asset management process can be observed; consultations as needed to prepare the seminar paper., 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10</td>
</tr>
<tr>
<td></td>
<td>11. Visit to a representative company where all the elements of an asset management process can be observed; consultations as needed to prepare the seminar paper., 1h, Learning outcomes: 1, 2</td>
</tr>
<tr>
<td></td>
<td>12. Visit to a representative company where all the elements of an asset management process can be observed; consultations as needed to prepare the seminar paper., 1h, Learning outcomes: 3, 4</td>
</tr>
<tr>
<td></td>
<td>13. Visit to a representative company where all the elements of an asset management process can be observed; consultations as needed to prepare the seminar paper., 1h, Learning outcomes: 5, 6</td>
</tr>
<tr>
<td></td>
<td>14. Visit to a representative company where all the elements of an asset management process can be observed; consultations as needed to prepare the seminar paper., 1h, Learning outcomes: 5, 6</td>
</tr>
<tr>
<td></td>
<td>15. Visit to a representative company where all the elements of an asset management process can be observed; consultations as needed to prepare the seminar paper., 1h, Learning outcomes: 9, 10</td>
</tr>
</tbody>
</table>

### Required materials

- Basic: classroom, blackboard, chalk...
- Whiteboard with markers
- Overhead projector
- Portable overhead projector
- Video equipment

### Exam literature

1. Bilješke nastavnika pripremljene za predavanja.

### Students obligations

- maximum of 3 absences from exercises

### Knowledge evaluation during semester

- Redovitost pohaja#10#0#50$ Redovitost pohaja

### Knowledge evaluation after semester

- Seminar, oral exam.

### Remark

- This course can not be used for final thesis theme
**Prerequisites:** No prerequisites.

**ISVU equivalents:** 22661;63922;63924;132262;161642;
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21783/22563</td>
<td>5.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name:** Bridges  
**Status:** 2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course  
**Teaching mode:** Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home  
**ECTS:** 30+15 (3+0+0+12)  
**Teachers:**  
- Lectures: 1. dr.sc. Igor Gukov, dipl.ing.građ.  
- Auditory exercises: 1. dr.sc. Igor Gukov, dipl.ing.građ.  
- Auditory exercises: Dalibor Mačkić  
- Construction exercises: Goran Puž  
**Course objectives:** Students will gain knowledge on historic development of bridges, requirements to be met by bridges, bridge construction methods, and major tasks related to the maintenance and use of bridges.  
**Learning outcomes:**  
1. make load analysis for pedestrian, road and railway bridges. Level:6,7  
2. prepare several bridge design solutions. Level:6,7  
3. select an optimum bridge solution. Level:7  
4. propose cross-sectional dimensions of a bridge. Level:6,7  
5. create a preliminary design for a bridge. Level:6,7  
**Methods of carrying out lectures:**  
- Ex cathedra teaching  
- Case studies  
- Demonstration  
- Simulations  
- Questions and answers  
**Methods of carrying out auditory exercises:**  
- Group problem solving  
- Computer simulations  
**How construction exercises are held:**  
- Group problem solving  
- Computer simulations  
Assignments are elaborated - with the assistant  
**Course content lectures**  
1. Introduction. History. General information. Types of bridges. The basic requirements for the bridges., 2h, Learning outcomes:3  
2. Actions on bridges., 2h, Learning outcomes:1  
3. The types of structures in bridges., 2h, Learning outcomes:2,3  
4. Substructure. Equipment bridges., 2h, Learning outcomes:2,3,4  
5. Plate-concrete bridges., 2h, Learning outcomes:2,3,4  
6. Ribbed concrete bridges., 2h, Learning outcomes:2,3,4  
7. Box-concrete bridges., 2h, Learning outcomes:2,3,4  
8. Arch bridges., 2h, Learning outcomes:2,3,4  
9. Beam and frame bridges. Rigid frame bridge. Integral bridges., 2h, Learning outcomes:2,3,4  
10. Suspension bridges., 2h, Learning outcomes:2,3,4  
11. Cable-stayed bridges., 2h, Learning outcomes:2,3,4  
12. Composite bridges. Truss bridges., 2h, Learning outcomes:2,3,4  
13. Bridges with steel girders. Steel orthotropic plate., 2h, Learning outcomes:2,3,4  
15. Examples of modern bridge design. The second colloquium., 2h, Learning outcomes:2,3,4  
**Course content auditory**  
1. Assign the task. Longitudinal section and plan view and cross sections of the bridge., 1h, Learning outcomes:2,5  
2. Substructure., 1h, Learning outcomes:2,5  
3. Bridge equipment and details., 1h, Learning outcomes:2,5  
4. Drawing and review dispositions., 1h, Learning outcomes:2,5  
5. Submission of completed preliminary drawing., 1h, Learning outcomes:5  
6. Actions on bridges. Transverse distributions., 1h, Learning outcomes:2,5  
7. Analysis of the load., 1h, Learning outcomes:1,5  
8. Creating a model., 1h, Learning outcomes:2,5  
9. Structural analysis., 1h, Learning outcomes:2,5  
10. The first colloquium., 1h, Learning outcomes:2,5  
11. Dimensioning., 1h, Learning outcomes:2,5  
12. Making a reinforcement drawing., 1h, Learning outcomes:2,5  
13. Technical description, equipment program., 1h, Learning outcomes:2,5  
14. Bills of quantities., 1h, Learning outcomes:2,5  
15. View and delivery of the overall program., 1h, Learning outcomes:5  
**Course content constructsures**  
1. Assign the task. Longitudinal section, plan view and cross sections of the bridge., 1h, Learning outcomes:2,5  
2. Substructure., 1h, Learning outcomes:2,5  
3. Bridge equipment and details., 1h, Learning outcomes:2,5  
4. Drawing and review dispositions., 1h, Learning outcomes:2,5
<table>
<thead>
<tr>
<th>No.</th>
<th>Activity Description</th>
<th>Time</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Submission of completed preliminary drawing.</td>
<td>1h</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Actions on bridges. Transverse distributions.</td>
<td>1h</td>
<td>2,5</td>
</tr>
<tr>
<td>7</td>
<td>Analysis of the load.</td>
<td>1h</td>
<td>1,2,5</td>
</tr>
<tr>
<td>8</td>
<td>Creating a model.</td>
<td>1h</td>
<td>2,5</td>
</tr>
<tr>
<td>9</td>
<td>Structural analysis.</td>
<td>1h</td>
<td>1,2,5</td>
</tr>
<tr>
<td>10</td>
<td>The first colloquium.</td>
<td>1h</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Dimensioning.</td>
<td>2h</td>
<td>2,5</td>
</tr>
<tr>
<td>12</td>
<td>Making a reinforcement drawing.</td>
<td>1h</td>
<td>2,5</td>
</tr>
<tr>
<td>13</td>
<td>Technical description, equipment program.</td>
<td>1h</td>
<td>2,5</td>
</tr>
<tr>
<td>14</td>
<td>Bills of quantities.</td>
<td>1h</td>
<td>2,5</td>
</tr>
<tr>
<td>15</td>
<td>View and delivery of the overall program.</td>
<td>1h</td>
<td>5</td>
</tr>
</tbody>
</table>

**Required materials**

- Basic: classroom, blackboard, chalk...
- Overhead projector

**Exam literature**

- Obavezna:

**Students obligations**

- maximum of 3 absences from exercises

**Knowledge evaluation during semester**

- Redovitost pohaa#12#10#50$Kolokvij, teorijska pitanja#1#70$Seminarski rad#1#20$S50$

**Knowledge evaluation after semester**

- The written part of the examination consists of five to seven questions, all relating to individual segments of the course. The oral part of the examination may be taken by students who obtained at least 60% of points.

**Remark**

- This course can be used for final thesis theme

**Prerequisites:**

- No prerequisites.
### Business Ethics and Law

**Status:** 2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode:** Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home

**ECTS:** 5.0

**Academic year:** 2017/2018

**Teachers:**
- Lectures: Ljiljana Matuško Antonić
- Auditory exercises: Ljiljana Matuško Antonić
- Seminar exercises: Ljiljana Matuško Antonić

**Course objectives:**
Introduce students to the interest group management theory and teach them about basic notions of civil law.

**Learning outcomes:**
1. standardize the notion of morals and ethics. Level: 6, 7
2. present theory of interested parties. Level: 6, 7
3. formulate/define CSR within the heart of the business strategy. Level: 6, 7
4. develop ethics theories. Level: 6, 7
5. formulate/define a framework for understanding an ethical decision making. Level: 6, 7
6. standardize properties of CSO's. Level: 6, 7

**Methods of carrying out lectures:**
- Case studies
- Discussion
- Questions and answers
- Seminar, students presentation and discussion
- Interactive lessons.

**Methods of carrying out auditory exercises:**
- Group problem solving
- Discussion, brainstorming
- Practice courses in real life situations.

**Methods of carrying out seminars:**
- Group problem solving
- Discussion, brainstorming

**Course content lectures**
- 1. Introduction to Civil Law, 2h, Learning outcomes: 5
- 2. Principles of Civil Law, 2h, Learning outcomes: 5
- 3. The subjects and objects of civil right, 2h, Learning outcomes: 5
- 4. Introduction to the law of obligations, 2h, Learning outcomes: 5
- 5. Subjects civil obligations relations, 2h, Learning outcomes: 5
- 6. Objects civil obligations relations, 2h, Learning outcomes: 5
- 7. Reinforcement of civil obligations relations, 2h, Learning outcomes: 5
- 8. The sales contract, Services contract, 2h, Learning outcomes: 5
- 9. Construction contract, 2h, Learning outcomes: 5
- 10. Loan Agreement, 2h, Learning outcomes: 5
- 11. The agency agreement, 2h, Learning outcomes: 5
- 12. Termination of an obligation relations, 2h, Learning outcomes: 5
- 13. Introduction to business ethics, principles, 2h, Learning outcomes: 5
- 15. The right to freedom of speech, work, family life, 2h, Learning outcomes: 5

**Course content auditory**
- 1. The sales contract, 2h, Learning outcomes: 5
- 2. Liability for defects stuff, 2h, Learning outcomes: 5
- 3. Protection of private life, 2h, Learning outcomes: 5
- 4. The banking secret, 2h, Learning outcomes: 5
- 5. The responsibility of the contractor, 2h, Learning outcomes: 5
- 6. Ineffectiveness of contract, 2h, Learning outcomes: 5
- 7. Relatively be invalid contracts, 2h, Learning outcomes: 5
- 8. Services contract, 2h, Learning outcomes: 5
- 9. Construction contract, 2h, Learning outcomes: 5
- 10. Loan Agreement, 2h, Learning outcomes: 5
- 11. The agency agreement, 2h, Learning outcomes: 5
- 12. Breach of contract, 2h, Learning outcomes: 5
- 13. Customer rights, 2h, Learning outcomes: 5
- 14. Right to work, 2h, Learning outcomes: 5
- 15. Negotiations, 2h, Learning outcomes: 5

**Course content seminars**
- 1. The sales contract, 2h, Learning outcomes: 5
- 2. Liability for defects stuff, 2h, Learning outcomes: 5
- 3. Protection of private life, 2h, Learning outcomes: 5
- 4. The banking secret, 2h, Learning outcomes: 5
- 5. The responsibility of the contractor, 2h, Learning outcomes: 5
- 6. Ineffectiveness of contract, 2h, Learning outcomes: 5
- 7. Relatively be invalid contracts, 2h, Learning outcomes: 5
- 8. Services contract, 2h, Learning outcomes: 5
- 9. Construction contract, 2h, Learning outcomes: 5
- 10. Loan Agreement, 2h, Learning outcomes: 5
- 11. The agency agreement, 2h, Learning outcomes: 5
- 12. Breach of contract, 2h, Learning outcomes: 5
- 13. Customer rights, 2h, Learning outcomes: 5
- 14. Right to work, 2h, Learning outcomes: 5
- 15. Negotiations, 2h, Learning outcomes: 5
<table>
<thead>
<tr>
<th><strong>Required materials</strong></th>
<th>Overhead projector</th>
</tr>
</thead>
</table>
2. Funky Business Kapital pleše samo s darovitima, Kjell A. Nordstrm Jonas Ridderstr#229;le (Differo)  
1. *Etika u gospodarstvu : (religije, moral, poslovanje)* / Tibor Karpati (Ekonomski fakultet u Osijeku)  
3. http://www.kurzweilai.net/  
4. *Gradansko pravo: Martin Vedriš, Petar Klarić, Narodne novine 2003*  
5. *Stvarno pravo: Nikola Gavella, Tatjana Josipović, Igor Gliha, Vlado Belaj, Zlatan Stjipković* |
| **Students obligations** | maximum of 3 absences from exercises |
| **Knowledge evaluation during semester** | Kolokvij#1#20#0$Usmena provjera znanja#1#80#0$ |
| **Knowledge evaluation after semester** | Writing a paper on subject and exam. |
| **Remark** | This course can be used for final thesis theme |
| **Prerequisites:** | No prerequisites. |
| **ISVU equivalents:** | 22663;63931;63933;132265; |
### Study programme for academic year 2017/2018

**Communication Skills**

**ECTS**: 5.0  
**Academic year**: 2017/2018

<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>Communication Skills</th>
</tr>
</thead>
</table>

**Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home**

**Teaching mode**

| Lectures:Pred. Ida Popčević prof.  |
| Laboratory exercises: Lucija Bačić |

**Course objectives**

- Sensitization to and understanding of basic notions on successful communication, and acquirement of techniques and skills needed for successful communication with individuals, within a group, and with the public. The course of lectures promotes humanistic values such as mutual responsibility, right to involvement and acceptance, free expression and respect, and tolerance of differences.

**Learning outcomes:**

1. use basic environmental management procedures. Level:
2. independently analyse and evaluate environmental impacts of a planned project. Level:
3. take part in an environmental impact study team. Level:
4. understand implementation rules of international conventions on environmental protection. Level:
5. include environmental protection measures in design documentation. Level:
6. demonstrate knowledge of environmental impact assessment procedures for plans, programs and projects, including knowledge of building permit procurement procedures, and their relationship with environmental protection measures and conditions. Level:
7. demonstrate knowledge of rights that can be exercised by the public, and possess appropriate skill in providing information, in including the public in environmental protection procedures, and in undertaking consultations and negotiations with the public. Level:
8. use literature from the field of environmental management. Level:
9. formulate/define the communication process, shape the communication process. Level:6,7
10. integrate verbal communication with non-verbal communication. Level:6,7
11. select option and form of communication with regard to a particular problem. Level:7
12. develop a successful communication with business partners. Level:6,7
13. classify forms of communication to enable their efficient use. Level:6,7
14. create and plan communication with a business partner. Level:6,7
15. critically evaluate business partners by studying the way in which they communicate, and by critical listening. Level:7
16. estimate the interlocutor's communication skills verbal and non-verbal communication. Level:7
17. create a favourable work climate for successful communication. Level:6,7
18. summarize communication results with analyses, presentation of the group and group conclusions. Level:6,7

**Methods of carrying out lectures**

- Ex cathedra teaching
- Case studies
- Demonstration
- Simulations
- Modelling
- Discussion
- Questions and answers
- Seminar, students presentation and discussion
- Homework presentation
- Lectures follow ERR pattern (evocation, reflection) which stimulates active learning. Requisites as PP-presentations or transparencies, video-clips, prepared texts, tables, self-assessment scales and others will be used.

**Methods of carrying out laboratory exercises**

- Group problem solving
- Traditional literature analysis
- Data mining and knowledge discovery on the Web
- Essay writing
- Discussion, brainstorming
- Mind mapping
- Interactive problem solving
- Workshop

**Course content lectures**

- Communication process, Verbal communication (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Non-verbal communication (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- The nature of interpersonal communication (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Barriers to successful communication (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Gender attitudes and working with people of same or different sex (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Cross-cultural differences more successful communication with persons of different cultural backgrounds (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Negative and positive aspects of conflicts (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Differentiation between positions, interests and needs of conflicting parties (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Constructive and destructive interaction and communication (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Specifics of group structure and processes (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Conflicts in groups and solutions to such conflicts (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Role and function of group leader focused on socio-emotional relations among group members, and meeting individual and group goals (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18
- Speaking before an audience (2). 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18

**Workshop**

- 15.x, 2h
| Course content | 1. Communication skills in contacts with individuals (2) . 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
|  | 2. Self-disclosure, assertiveness (2) . 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
|  | 3. Active listening. Empathic understanding (2) . 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
|  | 4. Communication rules (2) . 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
|  | 5. Synchronized conversation. (2), 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
|  | 6. Problem solving and conflict resolution techniques: collaborative problem solving, bargaining and negotiation, mediation (2) . 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
|  | 7. Conducting group discussions, debate (2) . 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
|  | 8. Representing the group and presenting conclusions reached by the group (2) . 2h, Learning outcomes:7,9,10,11,12,13,14,15,16,17,18 |
| Required materials | Basic: classroom, blackboard, chalk... |
|  | Whiteboard with markers |
|  | Overhead projector |
|  | Video equipment |
| Knowledge evaluation during semester | Regular attendance in teaching process, theoretical questions, seminar work |
| Knowledge evaluation after semester | Writing and oral examination |
| Remark | This course can not be used for final thesis theme |
| Prerequisites: | No prerequisites. |
| ISVU equivalents: | 22662,63925,63927; |
| Proposal made by | mr.sc. Slavko Belić, v.predavač, 31.01.2014 |
Code WEB/ISVU | 21897/66755 | ECTS | 6.0 | Academic year | 2017/2018
--- | --- | --- | --- | --- | ---
Name | Concrete Engineering Structures | | | | |
Status | 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course | | | | |
Teaching mode | Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home | 30+10 (10+0+0+0) | 140 |
Teachers | Lectures: Dr. sc. Igor Gukov, dipl. ing. građ. Auditory exercises: Dr. sc. Igor Gukov, dipl. ing. građ. Auditory exercises: Dalibor Mačkić |
Course objectives | Students will acquire knowledge and skills that are needed for the design, analysis and realization of concrete structures |
Learning outcomes: | 1. make a load analysis for a concrete structure. Level: 6,7 | |
Methods of carrying out lectures | Ex cathedra teaching | Case studies | Modelling | Questions and answers |
Methods of carrying out auditory exercises | Laboratory exercises, computer simulations | Group problem solving | Traditional literature analysis | Computer simulations | Workshop |
Course content lectures | 1. Prefabricated concrete structures., 2h, Learning outcomes: 2,4,5 | |
Course content auditory | 1. Creating a static spatial models more storey residential building., 1h, Learning outcomes: 1,2,4 | |
Required materials | Basic: classroom, blackboard, chalk... | |
Exam literature | Basic literature: | |
--- | --- | --- | --- | --- | ---
3. Tehnički propis za betonske konstrukcije, NN 101/05 | |
Additional literature:

<table>
<thead>
<tr>
<th>Students obligations</th>
<th>Knowledge evaluation during semester</th>
<th>Knowledge evaluation after semester</th>
<th>Remark</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>maximum of 3 absences from exercises</td>
<td>Redovitost pohaa. Kolokvij, teorijska pitanja. Seminarski rad. Programski zadatak.</td>
<td>Pismeni ispit. Usmeni ispit.</td>
<td>This course can be used for final thesis theme</td>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
<td>ECTS</td>
<td>Academic year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>---------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21779/22558</td>
<td>5.0</td>
<td>2017/2018</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Name
Construction Regulations

### Status
3rd semester - 1. - Technological professional study programme specialization in Civil Engineering (STARI Specijalisti - graditeljstva) - elective course

### Teaching mode
Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

### Teachers
Lectures: Gordana Ratkajec dipl.ing
Auditory exercises: Gordana Ratkajec dipl.ing

### Course objectives
Students, as future participants in the construction process, will learn how to harmonize the company operations with the regulations applicable to civil engineering, and especially with the building law.

### Learning outcomes:
1. correlate regulations from the field of civil engineering with special regulations relating to construction work. Level: 6, 7
2. critically analyse laws and regulations from other fields that are related to civil engineering. Level: 6, 7
3. compare practical implementation of regulations. Level: 6, 7
4. plan application of laws and regulations which regulate monitoring of design, construction, operation and maintenance activities. Level: 6, 7
5. reexamine legal aspects in the practical use of regulations. Level: 6, 7
6. defend position on the application of individual regulations in civil engineering. Level: 7

### Methods of carrying out lectures
Ex cathedra teaching
Case studies
Discussion
Questions and answers
Other
Appropriate teaching aids (video projector and computer) will be used as appropriate in the presentation of lectures.

### Methods of carrying out auditory exercises
Group problem solving
Discussion, brainstorming
Other
Practical cases of individual segments of completed projects are analyzed, particularly from the aspect of documents and documentation.

### Course content lectures
1. Legal system, sources of law, legal subjects, 2h, Learning outcomes: 2, 3, 5
2. Legal relationships, legal affairs, protection of rights, 2h, Learning outcomes: 2, 3, 5
3. Fundamentals of property law, property, ownership, right of way, 2h, Learning outcomes: 1, 2, 3, 6
4. Fundamentals of economic law, 2h, Learning outcomes: 2, 3, 5
5. Construction regulations, regulations relating to construction industry, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6
6. Physical planning, Buildable land, 2h, Learning outcomes: 1, 2, 4, 6
7. Participants in construction, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6
8. Location permit, building permit, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6
9. Decision to invest, technical documentation, 2h, Learning outcomes: 1, 3, 4, 6
10. Award of construction contract, procurement of works, 2h, Learning outcomes: 3, 4, 5
11. Site documents, 2h, Learning outcomes: 2, 3, 4, 6
12. Works supervision and inspection supervision, 2h, Learning outcomes: 2, 3, 4, 5
13. Acceptance of works and final account, 2h, Learning outcomes: 2, 3, 4, 5
14. Final inspection and operating permit, 2h, Learning outcomes: 2, 3, 4, 5
15. Occupational safety, 2h, Learning outcomes: 1, 2, 3, 6

### Course content auditory
1. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
2. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
3. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
4. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
5. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
6. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
7. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
8. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
9. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
10. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
11. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
12. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
13. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
14. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
15. Fundamentals of economic law, construction regulations as a highly specialized field covering the building law, technical regulations and related procedures, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6
### Required materials
- Basic: classroom, blackboard, chalk...
- Whiteboard with markers
- Overhead projector

### Exam literature
1. Zakon o gradnji
2. Zakon o prostornom uredenju
3. Zakon o arhitektonskim i inženjerskim poslovima i djelatnostima u prostornom uredenju i gradnji
4. Simić-Bosanac: Građevinska regulativa; Centar za informacije i publicitet, Zagreb 1978
6. V.Gorenc, Trgovačko pravo-ugovor, ŠK, Zagreb 1993

### Students obligations
- Maximum of 3 absences from exercises

### Knowledge evaluation during semester
- Regularity in attendance
- Colloquium, theoretical questions
- Seminar paper

### Knowledge evaluation after semester
- Oral part of the examination after successful presentation and justification of the seminar paper.

### Remark
- This course can be used for final thesis theme

### Prerequisites
- No prerequisites.
Zagreb University of Applied Sciences  
Study programme for academic year 2017/2018

<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21819/22642</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name:** Construction Project Management  

**Status:** 2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course  

**Teaching mode:** Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home  

**ECTS:** 30+9 (9+0+0+0)  

**Academic year:** 2017/2018  

**Teachers:**  
- Lectures: 1. Josip Čengija  
- Lectures: 2. mr.sc. Petar Adamović prof.v.škole  
- Auditory exercises: Belinda Brucker  
- Auditory exercises: Josip Čengija  
- Auditory exercises: Tomislav Zrinski  

**Course objectives:** Students are taught to independently manage organizational processes and systems on a construction project.  

**Learning outcomes:**  
1. formulate/define the concept of a construction project. Level:6,7  
2. critically evaluate possible solutions and make decisions under conditions of uncertainty. Level:7  
3. select an optimum way to realize a project. Level:7  
4. organise all participants in the project in an optimum way. Level:6,7  
5. plan activities, time, and resources that are needed to realize a construction project. Level:6,7  
6. anticipate possible adverse effects on a project and a response to such effects. Level:6,7  
7. estimate all project risks. Level:6,7  
8. manage project in all phases. Level:6,7  
9. valorise project result as related to initial project objectives. Level:7  
10. lead project team during definition, planning and implementation of the project. Level:6,7  

**Methods of carrying out lectures:**  
- Ex cathedra teaching  
- Case studies  
- Discussion  
- Questions and answers  
- Other  
- Appropriate teaching aids (video projector and computer) are used during lectures in order to vividly present and enhance comprehension of course material.  

**Methods of carrying out auditory exercises:**  
- Group problem solving  
- Discussion, brainstorming  
- Other  
- Practical cases of individual segments pertaining to the organization and management of construction projects are analyzed, and instructions are given about possible solutions as necessary for the preparation of the assignment (project management program).  

**Course content lectures**  
1. Introduction, systemic approach, project phases, project structure and objectives, 2h, Learning outcomes:1,2,3,4,8,10  
2. Participants in the project, project feasibility, 2h, Learning outcomes:1,2,3,4,9  
3. Project management elements, 2h, Learning outcomes:1,2,3,4,9,10  
4. Time planning and controlling; cost planning and controlling, 2h, Learning outcomes:1,2,3,5,10  
5. Contracts, origins of contract legislation, 2h, Learning outcomes:10  
6. Contracts on construction work, contracts for the provision of consulting services and project management, 2h, Learning outcomes:3,6,8,9  
7. Linking participants in the project, 2h, Learning outcomes:1,2,3,4  
8. Managing project documents, 2h, Learning outcomes:1,2,3,6,7  
9. Risk and risk management, 2h, Learning outcomes:1,2,3,6,7  
10. Information systems on projects, 2h, Learning outcomes:1,2,3,9,10  
11. Management systems, 2h, Learning outcomes:1,2,3,4,5,6,7,10  
12. Decision making, 2h, Learning outcomes:2,3,4,5,6,7,10  
13. Organization design, 2h, Learning outcomes:3,4,5,9  
14. Legal forms of companies, 2h, Learning outcomes:1,2,4,5,9  
15. Concessions and BOT projects, 2h, Learning outcomes:1,2,3,7  

**Course content auditory**  
1. Analyses and comments: project feasibility, procurement and award of works, time management, cost management, document management, risk management, organizations and management., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10  
2. Analyses and comments: project feasibility, procurement and award of works, time management, cost management, document management, risk management, organizations and management., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10  
3. Analyses and comments: project feasibility, procurement and award of works, time management, cost management, document management, risk management, organizations and management., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10  
4. Analyses and comments: project feasibility, procurement and award of works, time management, cost management, document management, risk management, organizations and management., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9,10  
5. Analyses and comments: project feasibility, procurement and award of works, time management, cost management, document management, risk management, organizations and management., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10  
6. no classes, 1h  
7. no classes, 2h  
8. no classes, 2h  
9. no classes, 2h  
10. no classes, 2h  
11. no classes, 2h  
12. no classes, 2h  
13. no classes, 2h

---

stranica 21 / 87
### Required materials

- Basic: classroom, blackboard, chalk...
- Whiteboard with markers
- Overhead projector
- Video equipment

### Exam literature


### Students obligations

- maximum of 3 absences from exercises

**Knowledge evaluation during semester**

- Redovitost pohađanja
- Kolokvij
- Teorijska pitanja

**Knowledge evaluation after semester**

- Written examination from the theory (lectures) and exercises (solving problems based on the project management program).
- Oral examination (for students who passed the written examination).

### Remark

- This course can be used for final thesis theme

### Prerequisites:

- No prerequisites.

### Proposal made by

<table>
<thead>
<tr>
<th>Course content lectures</th>
<th>Course content auditory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General notions on earthquake action. Formation, structural influence and historic overview of catastrophic earthquake, 4h, Learning outcomes: 1</td>
<td></td>
</tr>
<tr>
<td>2. Introduction to structural dynamics. Oscillation of systems with a single degree of freedom. Notion of resonance and the influence of resonance on structures, 6h, Learning outcomes: 1</td>
<td></td>
</tr>
<tr>
<td>3. Oscillation of systems with several degrees of freedom. Problem of oscillation form (eigenvectors) and oscillation frequencies (eigenvales). Stodola-Vianello method, 4h, Learning outcomes: 1</td>
<td></td>
</tr>
<tr>
<td>4. Design recommendations (selection of structure disposition, foundation method, reinforcement details, etc.), 4h, Learning outcomes: 2, 3</td>
<td></td>
</tr>
<tr>
<td>5. Seismic regulations. Quasi-static building design, 4h, Learning outcomes: 3, 4</td>
<td></td>
</tr>
<tr>
<td>6. Spectral building design, 4h, Learning outcomes: 3, 4</td>
<td></td>
</tr>
<tr>
<td>7. Introduction to building design with seismic excitation records (accelerograms). Explanation of design requirements for earthquake-prone areas, 4h, Learning outcomes: 3, 4, 5, 8, 9</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td></td>
</tr>
<tr>
<td>Required materials</td>
<td>Basic: classroom, blackboard, chalk...</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td></td>
<td>General purpose computer laboratory</td>
</tr>
<tr>
<td></td>
<td>Whiteboard with markers</td>
</tr>
<tr>
<td></td>
<td>Overhead projector</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Students obligations</th>
<th>Class attendance and positively evaluated project</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation during semester</th>
<th>Redovitost pohaa#5#$60$Programski zadatak#1#0#100$</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
<th>Computer-aided preparation of the assignment. The examination is oral only. During examination, students are asked to explain details and procedures used in assignment preparation. This examination may be taken after preparation of the assignment.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Remark</th>
<th>This course can be used for final thesis theme</th>
</tr>
</thead>
</table>

<p>| Prerequisites: | No prerequisites. |</p>
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>21891/63929</th>
<th>ECTS</th>
<th>5.0</th>
<th>Academic year</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>Economics and Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalista graditeljstva) - obligatory course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Teaching mode</strong></td>
<td>Lectures + exercises (auditory + laboratory + seminar + methodology + construction)</td>
<td>30+15 (8+0+7+0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
<td>Lectures:doc.dr.sc. Dalija Kuvačić profesor visoke škole Auditory exercises:doc.dr.sc. Dalija Kuvačić profesor visoke škole Seminar exercises:doc.dr.sc. Dalija Kuvačić profesor visoke škole</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Course objectives</strong></td>
<td>Students will acquire knowledge about basic economic principles, cost problems, and business results, which is aimed at facilitating company management and business decision-making. In addition, students will be familiarized with traditional and modern organizational concepts, internal and external organizational factors, notion of management with management functions and levels, and with strategic management.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methods of carrying out lectures</strong></td>
<td>Ex cathedra teaching Other Lectures and auditory exercises auditory (LCD and computer or OHP or blackboard).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methods of carrying out auditory exercises</strong></td>
<td>Group problem solving Other Lectures and auditory exercises auditory (LCD and computer or OHP or blackboard).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methods of carrying out seminars</strong></td>
<td>Other Student prepares seminar and presents it for the group.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Course content auditory</strong></td>
<td>1. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9 2. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9 3. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9 4. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9 5. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9 6. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9 7. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9 8. Explanation of basic economic concepts, and analysis of the relationship between investment of production factors and results. Analysis of the cost and result relationship, and study of business and production results achieved, including preparation of the corresponding calculation. 1h, Learning outcomes:1,2,3,4,5,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>9.no classes, 1h 10.no classes, 1h 11.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course content seminars</td>
<td>1.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.no classes, 1h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Preparation of a seminar paper on a specific topic relating to the field of economics and management, and presentation of the paper., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Preparation of a seminar paper on a specific topic relating to the field of economics and management, and presentation of the paper., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Preparation of a seminar paper on a specific topic relating to the field of economics and management, and presentation of the paper., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Preparation of a seminar paper on a specific topic relating to the field of economics and management, and presentation of the paper., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Preparation of a seminar paper on a specific topic relating to the field of economics and management, and presentation of the paper., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Preparation of a seminar paper on a specific topic relating to the field of economics and management, and presentation of the paper., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Preparation of a seminar paper on a specific topic relating to the field of economics and management, and presentation of the paper., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Required materials**

- Basic: classroom, blackboard, chalk...
- Whiteboard with markers
- Overhead projector
- Video equipment

**Exam literature**

- Bilješke koje nastavnik priprema za nastavu
- Ž. Majcen.: Troškovi u teoriji i praksi, Informator, Zagreb, 1981.

**Students obligations**

- maximum of 3 absences from exercises
- Redovitost pohaa#15#0#60$Kolokvij, teorijska pitanja#2#80#60$Seminarski rad#1#20#100$
- Written and oral exam.

**Remark**

- This course can be used for final thesis theme
- No prerequisites.

**ISVU equivalents:**

- 22660;63928;63930;132264;
### Course: Engineering Buildings (Civil Engineering)

#### Name
2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course

#### Teaching mode
Lectures + exercises (auditory + laboratory + methodology + construction) work at home

#### ECTS
6.0

#### Academic year
2017/2018

#### Course objectives
Students will acquire an in-depth knowledge relating to the design, calculation and realization of engineering structures made of concrete, steel and wood.

#### Learning outcomes:
1. prepare load analysis for concrete, steel and wooden structures. Level:6,7
2. define simpler structural analysis models and static solutions for structures of medium complexity. Level:6,7
3. determine load bearing capacity of model elements based on the ultimate bearing capacity and serviceability methods. Level:7
4. prepare bending schedules for slabs, beams, columns and walls using a computer software. Level:6,7
5. present complex static systems of steel structures. Level:6,7
6. predict steel structure failure modes. Level:6,7
7. produce documentation for the preparation of workshop drawings for steel and timber structures. Level:6,7
8. justify cost-effectiveness of material used in engineering structures. Level:7

#### Methods of carrying out lectures
- Ex cathedra teaching
- Case studies
- Modelling
- Real-life structures are presented in all phases of design, fabrication and assembly, using drawings, photographs and video projections as appropriate.

#### Methods of carrying out auditory exercises
- Group problem solving
- Traditional literature analysis
- Other
- Structures and related calculations are presented on drawings, and explanations are given when necessary.

#### How construction exercises are held
- Group problem solving
- Computer simulations
- Other
- Presentation of the detailed design and working design of a structure.

#### Course content

##### Lectures
1. Introduction: overview of existing concrete, prestressed concrete, steel and wood engineering structures typical for civil infrastructure and building engineering, 2h, Learning outcomes:2
2. Introduction: overview of existing concrete, prestressed concrete, steel and wood engineering structures typical for civil infrastructure and building engineering, 2h, Learning outcomes:2
3. Structural systems, selection of materials, and spatial stability., 2h, Learning outcomes:6,7
4. Structural systems, selection of materials, and spatial stability., 2h, Learning outcomes:6,7
5. Calculation principles (Eurocode 0, 1) and forces acting on structures, 2h, Learning outcomes:1
6. Calculation methods and selection of calculation model, 3h, Learning outcomes:1,2,4
7. Engineering software for the calculation and drawing of structures, 2h, Learning outcomes:1,2,4
8. Design of structural elements and typical details according to Eurocode 2, 3, 5, 2h, Learning outcomes:5,7,8
9. Design of structural elements and typical details according to Eurocode 2, 3, 5, 2h, Learning outcomes:5,7,8
10. Safety and stability, 2h, Learning outcomes:5,7
11. Fire protection, 1h
12. Corrosion protection, 2h
13. Protection against moisture, 1h
14. Durability and maintenance of structures, 2h
15. Examples of existing concrete, steel and wooden structures, 3h, Learning outcomes:1,2,3,4,5,6,7,8,9

##### Auditory
1. Structural system selection, 2h, Learning outcomes:1,2
2. Design model selection and use of computer software in the design process, 2h, Learning outcomes:3,4
3. Individual segments of the design of structural elements , 3h, Learning outcomes:5
4. Presentation of working drawings with details, 3h, Learning outcomes:8,9
5. -
6. -
7. -
8. -
9. -
10. -
11. -
12. -
13. -
14. -
15. -

##### Constructures
1. Preparation of structural drawings detailed design, 3h, Learning outcomes:3,7,9
2. Structural analysis, 4h, Learning outcomes:1,3,4,5,7,8
3. Preparation of working drawings for a structure, with typical details, 8h, Learning outcomes:6,8,9
4. -
5. -
### Required materials
- Basic: classroom, blackboard, chalk...
- General purpose computer laboratory
- Whiteboard with markers
- Overhead projector
- Portable overhead projector
- Video equipment

### Exam literature
1. I. Tomičić: BETONSKE KONSTRUKCIJE, Školska knjiga, 1988, i 1996
3. S. Takač: Novi koncept sigurnosti drvenih konstrukcija, Grad. Fak. Osijek
4. Dopunska literatura:
   - Handbook 2 - Design of timber structures according to ECI, TGMTIS, 2008
   - Literatura: 1 4, jezik: engleski ili njemački, www: detail.de
   - Stahl im Hochbau, priručnik

### Students obligations
- Maximum of 3 absences from exercises
- Completed project assignment

### Knowledge evaluation during semester
- Class attendance
- Passed colloquium

### Knowledge evaluation after semester
- Preparation of assignment (Structural Design).
- Oral justification of the assignment (Structural Design).

### Remark
- This course can be used for final thesis theme

### Prerequisites
- No prerequisites.

### Proposal made by
- Prof. Boris Baljkas, dipl.ing.grad, 20.4.2014
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21899/67043</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name:** Environmental Management

**Status:** 2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti građevnja) - obligatory course

**Teaching mode:** Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home 30+30 (30+0+0+0) 120

**Teachers:**
- Lectures: mr. sc. Gorana Ćosić-Flajsig viši predavač
- Lectures: dr. sc. Sanja Morić predavačica
- Auditory exercises: mr. sc. Gorana Cosić-Flajsig viši predavač
- Auditory exercises: Tamara Ivelja
- Auditory exercises: dr. sc. Sanja Morić predavačica

**Course objectives:** Students are taught to apply elementary instruments of environmental protection.

**Learning outcomes:**
1. know how to use basic environmental management procedures. Level: 1
2. Independently analyse and evaluate environmental impacts of a planned project. Level: 2
3. take part in an environmental impact study team. Level: 3
4. understand implementation rules of international conventions on environmental protection. Level: 4
5. include environmental protection measures in design documentation. Level: 5
6. demonstrate knowledge of environmental impact assessment procedures for plans, programs and projects, including knowledge of building permit procurement procedures, and their relationship with environmental protection measures and conditions. Level: 6
7. demonstrate knowledge of rights that can be exercised by the public, and possess appropriate skill in providing information, in including the public in environmental protection procedures, and in undertaking consultations and negotiations with the public. Level: 7
8. use literature from the field of environmental management. Level: 8

**Methods of carrying out lectures:** Explanations and graphic presentations are used with the aim of giving insight into environmental impact assessment procedures and environmental management procedures in companies. Each procedure is explained from the aspects of obligation of implementation, selection method, national and international legal framework and public participation. Concrete examples from practice are used for discussion about relevant issues regarding procedures and decision-making.

**Methods of carrying out auditory exercises:** Students prepare seminars in groups, under lecturer’s supervision and assistance.

**Course content lectures**
1. Environmental impact assessment based on individual interventions, 2h, Learning outcomes: 1, 2, 8
2. Environmental impact assessment based on individual interventions, 2h, Learning outcomes: 1, 2
3. Environmental impact assessment based on individual interventions, 2h, Learning outcomes: 2, 4, 7, 8
4. Assessment of environmental impact of plans, programs, strategies and legislation (Strategic Environmental Assessment), 2h, Learning outcomes: 1, 2, 6, 7, 8
5. Assessment of environmental impact of plans, programs, strategies and legislation (Strategic Environmental Assessment), 2h, Learning outcomes: 1, 2, 6, 7, 8
6. Assessment of environmental impact of plans, programs, strategies and legislation (Strategic Environmental Assessment), 2h, Learning outcomes: 1, 2, 6, 7, 8
7. Assessment of environmental impact of plans, programs, strategies and legislation (Strategic Environmental Assessment), 2h, Learning outcomes: 1, 2, 6, 7, 8
8. Preparation and assessment of Environmental Impact Studies, 2h, Learning outcomes: 5, 8
9. Preparation and assessment of Environmental Impact Studies, 2h, Learning outcomes: 5, 8
10. Preparation and assessment of Environmental Impact Studies, 2h, Learning outcomes: 5, 8
11. Integrated environmental permit. Eco-Management and Audit Scheme (EMAS). ISO 14 000 , 2h, Learning outcomes: 5, 8
12. Integrated environmental permit. Eco-Management and Audit Scheme (EMAS). ISO 14 000 , 2h, Learning outcomes: 5, 8
13. Integrated environmental permit. Eco-Management and Audit Scheme (EMAS). ISO 14 000 , 2h, Learning outcomes: 5, 8
15. Legal framework in the Republic of Croatia and the European Union. International conventions, 2h, Learning outcomes: 4, 8

**Course content auditory**
Upute i konzultacije za seminarski rad iz odabranih područja (6).

**Required materials**
- Basic: classroom, blackboard, chalk...
- Whiteboard with markers
- Overhead projector
- Video equipment

**Exam literature**
1. Lee, N.: Environmental Impact Assessment, A Training Guide, EIA Centre, Department of planning and Landscape, University of Manchester, 1989; Canter,
3. Zakon o zaštiti okoliša, Narodne novine br. 82/94;
4. Pravilnik o procjeni utjecaja na okoliš, Narodne novine br. 59/00.
7. Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a
<table>
<thead>
<tr>
<th><strong>Students obligations</strong></th>
<th>Transboundary Context, <a href="http://www.unece.org">www.unece.org</a>; maximum of 3 absences from exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge evaluation during semester</strong></td>
<td>Redovitost pohaa#10#0#50$Kolokvij, teorijska pitanja#2#100#50$</td>
</tr>
<tr>
<td><strong>Knowledge evaluation after semester</strong></td>
<td>Oral exam.</td>
</tr>
<tr>
<td><strong>Remark</strong></td>
<td>This course can not be used for final thesis theme</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>No prerequisites.</td>
</tr>
<tr>
<td><strong>ISVU equivalents:</strong></td>
<td>22641;</td>
</tr>
</tbody>
</table>
Zagreb University of Applied Sciences
Study programme for academic year 2017/2018

<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEB/ISVU</td>
<td>3.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

### Name
Fire Protection

### Status
3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalista graditeljstva) - elective course

### Teaching mode
Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

### ECTS
15+15 (9+0+6+0) 60

### Teachers
- Lectures: mr.sc. Ljerka Kopričanec-Matijevac viši predavač
- Auditory exercises: mr.sc. Ljerka Kopričanec-Matijevac viši predavač
- Seminar exercises: mr.sc. Ljerka Kopričanec-Matijevac viši predavač

### Course objectives
Students will be taught to realize fire-resistant structures.

### Learning outcomes:
1. Formulate/define scope of design services for fire protection. Level: 6, 7
2. Select regulations, standards and other legislation as needed for preparing the fire protection report. Level: 7
3. Write down basic information about the building, including data about access for fire-fighting equipment, building structures, and occupancy of space within the building. Level: 6, 7
4. Define building partitioning system for fire protection. Level: 6, 7
5. Compare the designed building with relevant data contained in regulations and standards. Level: 6, 7
6. Propose the buildings fire escape routes. Level: 6, 7
7. Estimate fire load for a building. Level: 7
8. Propose realization of fire protection as necessary for individual structures and spaces. Level: 7
9. Plan fire-fighting equipment and devices. Level: 6, 7

### Methods of carrying out lectures
- Ex cathedra teaching
- Case studies
- Discussion
- Questions and answers
- Seminar, students presentation and discussion

Lectures will be illustrated with foils and computer presentations. A selection of fire-related photographs will be shown, and the causes of structural collapse will be analyzed, with a review of fire protection system used (or not used) on the project. Lecture notes with instructive illustrations will be handed out during lectures to enhance comprehension of the course material.

### Methods of carrying out auditory exercises
- Group problem solving
- Traditional literature analysis
- Solving fire protection problems for selected structures.

### Methods of carrying out seminars
- Traditional literature analysis
- Data mining and knowledge discovery on the Web
- Essay writing

Based on recommended literature, every student will independently elaborate a selected fire protection topic and will present the topic to other students in the group.

### Course content lectures
1. The plan of the course content and exams, 1h
   Relevant legislation, 1h, Learning outcomes: 1.2
2. Fire protection measures in physical planning, 1h, Learning outcomes: 1.2
   Various approaches to fire fighting issue, 1h, Learning outcomes: 1.2, 3
   Behaviour of construction materials during fire - flammability testing, fire load, 2h, Learning outcomes: 2.7
3. Fire resistance of structural elements and assemblies - standard fire curve, testing, 2h, Learning outcomes: 1.2, 3, 5, 7
4. Protection of civil engineering structures, 1h, Learning outcomes: 1.2, 5
5. Development of fire in confined spaces and its spreading: protection measures - fire sector, fire wall, 1h, Learning outcomes: 1.2, 3, 4, 8
6. Transfer of fire from one structure to another, 1h, Learning outcomes: 1.2, 3, 5, 8, 9
7. Fire sector dimensioning, 1h, Learning outcomes: 1.2, 3, 4, 5
8. Smoke sector dimensioning, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
9. Fire susceptibility assessment and fire protection plan, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
10. Fire susceptibility assessment and fire protection plan, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
11. Development and spreading of smoke within a structure and protection measures - smoke sector, smoke removal, 1h, Learning outcomes: 1.2, 3, 4, 8, 9
12. Protection of persons in structures - evacuation routes, 1h, Learning outcomes: 1.2, 3, 6, 8
13. Fire action on individual types of structures, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
14. Fire susceptibility assessment and fire protection plan, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
15. Fire susceptibility assessment and fire protection plan, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
16. Fire susceptibility assessment and fire protection plan, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
17. Fire susceptibility assessment and fire protection plan, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9

### Course content auditory
1. no lectures
2. no lectures
3. no lectures
4. no lectures
5. no lectures
6. no lectures
7. no lectures
8. no lectures
9. no lectures
10. no lectures
11. no lectures
12. no lectures
13. Fire escape route dimensioning, 1h, Learning outcomes: 1.2, 3, 4, 5, 8, 9
14. Fire susceptibility assessment and fire protection plan, 1h, Learning outcomes: 1.2, 3, 4, 5, 6, 7, 8, 9
15. no lectures
| Course content seminars | 1. Instructions for writing a seminar paper and presentation of existing, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9  
2. no lectures  
3. no lectures  
4. no lectures  
5. no lectures  
6. no lectures  
7. no lectures  
8. no lectures  
9. no lectures  
10. no lectures  
11. presentation of seminar paper, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9  
12. presentation of seminar paper, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9  
13. no lectures  
14. presentation of seminar paper, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9  
15. presentation of seminar paper, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9 |
|---|---|
| Required materials | Basic: classroom, blackboard, chalk...  
Whiteboard with markers  
Overhead projector |
| Exam literature | Basic literature:  
10. Materijali dobiveni na vježbama i predavanjima  
Additional literature:  
| Students obligations | maximum of 3 absences from exercises |
| Knowledge evaluation during semester | Kolokvij, teorijska pitanja#2#80#60$Seminarski rad#1#20#60$ |
| Knowledge evaluation after semester | test paper  
oral examination |
<p>| Remark | This course can be used for final thesis theme |
| Prerequisites: | No prerequisites. |</p>
<table>
<thead>
<tr>
<th>Code WEB/ISU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>27188/22570</td>
<td>3.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name**: Geotechnology

**Status**: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home

**ECTS**: 15+4 (4+0+0+0)

**Teachers**: Lectures:1. mr.sc. Željko Lebo v. pred.
Auditory exercises:mr.sc. Željko Lebo v. pred.

**Course objectives**: Students will gain an in-depth knowledge for the realization of specialist works in the field of geotechnics.

**Learning outcomes**:  
1. Analyse basic problems related to organization of geotechnical works. Level: 7  
2. Critically analyse and recognise possibility for realizing individual geotechnical solutions based on available equipment and technology. Level: 7  
3. Define work technology for jet grouting, plank driving, anchoring, RC diaphragm installation, and concreting under foundations. Level: 6, 7  
4. Select an applicable technology for the protection of foundation pits, excavations and cuttings, or for existing soil strengthening. Level: 7  
5. Gather together technical documents that must be kept on the site during realization of geotechnical works. Level: 6, 7  
6. Determine minimum technical correctness of design documentation for the conduct of geotechnical activities. Level: 7  
7. Propose additions to design documents to take into account the proposed foundation pit excavation or protection technology. Level: 6, 7

**Methods of carrying out lectures**: Ex cathedra teaching  
Case studies  
Discussion  
Questions and answers  
Other  
Specialist geotechnical works are presented and illustrated with simple models and animations.

**Methods of carrying out auditory exercises**: Group problem solving  
Discussion, brainstorming

**Course content lectures**:  
1. Introductory lecture, 1h, Learning outcomes: 1, 3  
2. Introductory lecture, 1h, Learning outcomes: 1, 3  
3. Soil and rock grouting, 1h, Learning outcomes: 1, 2, 3  
4. Soil and rock grouting, 1h, Learning outcomes: 1, 2, 3  
5. Anchoring, 1h, Learning outcomes: 1, 3  
6. Anchoring, 1h, Learning outcomes: 1, 3  
7. Shotcrete, 1h, Learning outcomes: 1, 3  
8. Shotcrete, 1h, Learning outcomes: 1, 3  
9. Drainage, 1h, Learning outcomes: 3, 4, 5  
10. Drainage, 1h, Learning outcomes: 3, 4, 5  
11. Geosynthetics in construction industry, 1h, Learning outcomes: 3, 4  
12. Geosynthetics in construction industry, 1h, Learning outcomes: 3, 4  
13. Use of micropiles in construction industry, 1h, Learning outcomes: 3, 4, 5, 6, 7  
14. Use of micropiles in construction industry, 1h, Learning outcomes: 3, 4, 5, 6, 7  
15. Use of micropiles in construction industry and protection of construction pit, 1h, Learning outcomes: 3, 4, 5, 6, 7

**Course content auditory**:  
1. Analysis of practical examples relating to grouting, anchoring and shotcreting, 1h, Learning outcomes: 1, 3  
2. Analysis of practical examples relating to grouting, anchoring and shotcreting, 1h, Learning outcomes: 1, 3  
3. Analysis of practical examples relating to drainage and the use of geosynthetics and micropiles, 1h, Learning outcomes: 1, 4  
4. Analysis of practical examples relating to drainage and the use of geosynthetics and micropiles, 1h, Learning outcomes: 1, 4  
5. no classes, 1h  
6. no classes, 1h  
7. no classes, 1h  
8. no classes, 1h  
9. no classes, 1h  
10. no classes, 1h  
11. no classes, 1h  
12. no classes, 1h  
13. no classes, 1h  
14. no classes, 1h  
15. no classes, 1h

**Required materials**: Basic: classroom, blackboard, chaik...  
Whiteboard with markers  
Overhead projector

**Exam literature**:  
Ž. Lebo, Separati predavanja na web-u  
Grupa autora: Mehanika stijena; Temeljenje; Podzemni radovi, Zagreb, 1983  
L. Fingerhut: Konsolidacija tla injektiranjem, varaždin 1977  

**Students obligations**: maximum of 3 absences from exercises
<table>
<thead>
<tr>
<th>Knowledge evaluation during semester</th>
<th>Redovitost pohaa#10#0#50$Programski zadatak#1#0#100$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge evaluation after semester</td>
<td>Written part of the examination consists of: 1. Numerical example of drainage and/or anchoring design. 2. Problems - two questions relating to topics presented during lectures. Oral part of the examination (may be taken by students who obtained at least 60 percent of points during the written part of the examination.</td>
</tr>
<tr>
<td>Remark</td>
<td>This course can be used for final thesis theme</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Proposal made by</td>
<td>mr.sc. Željko Lebo, senior lecture from 30.6.2015</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
<td>ECTS</td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>ZI065/43153</td>
<td>30.0</td>
</tr>
</tbody>
</table>

**Name**
Graduation Thesis

**Status**
4th semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course

**Teaching mode**
Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home

**Teachers**
Seminar exercises: mr. Ante Goran Bajić viši predavač
Seminar exercises: dr. sc. Mladen Petričec dipl. ing. grad.

**Course objectives**
Use of acquired knowledge for independent realization of practical engineering tasks.

**Learning outcomes:**
1. Identify a problematic situation. Level: 7
2. Analyze a problematic situation. Level: 6
3. Divide problematic situation into individual components. Level: 6
4. Identify proposal or solution to a problematic situation. Level: 6
5. Integrate existing scientific knowledge to find solution to the problem that has been identified. Level: 6, 7
6. Develop a practical solution to a problem. Level: 6, 7
7. Define limits and generalization possibilities for the final paper. Level: 6, 7
8. Present work results. Level: 6, 7

**Methods of carrying out seminars**
- Other

**Course content seminars**
1. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
2. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
3. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
4. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
5. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
6. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
7. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
8. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
9. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
10. Independent work, consultations with tutor (mentor), 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
11. Independent work, consultations with tutor (mentor), 3h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
12. Independent work, consultations with tutor (mentor), 3h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
13. Independent work, consultations with tutor (mentor), 3h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
14. Independent work, consultations with tutor (mentor), 3h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8
15. Independent work, consultations with tutor (mentor), 3h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8

**Required materials**
Special equipment

**Exam literature**
U dogovoru s mentorom

**Students obligations**
maximum of 3 absences from exercises

**Knowledge evaluation during semester**
Praktični ispit

**Knowledge evaluation after semester**
Practical exam

**Remark**
This course can not be used for final thesis theme

**Prerequisites:**
No prerequisites.
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>21963/103154</th>
<th>ECTS</th>
<th>30.0</th>
<th>Academic year</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>Graduation Thesis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>4th semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Teaching mode</strong></td>
<td>Lectures + exercises (auditory + laboratory + seminar + methodology + construction)</td>
<td>0+120 (0+0+120+0)</td>
<td>780</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
<td>Seminar exercises: 1. mr.sc. Ante Goran Bajić viši predavač</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prerequisites</strong></td>
<td>No prerequisites.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remark: This course can not be used for final thesis theme.
### Name
Investment Policies

### Status
3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

### Teaching mode
Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

### ECTS
6.0

### Academic year
2017/2018

### Code WEB/ISVU
21780/22559

### Course objectives
Students will gain theoretical knowledge and practical skills for investment project planning, for performing financial and economic analyses, and for estimating feasibility of proposed investment projects.

### Learning outcomes:
1. Integrate various resources that are needed for realization of a capital investment project. Level: 6, 7
2. Plan realization of a capital investment project. Level: 6, 7
3. Prepare feasibility study for a capital investment project. Level: 6, 7
4. Measure quantities of resources needed for realization of a capital investment project. Level: 6, 7
5. Classify resources needed for realization of a capital investment project. Level: 6, 7
6. Combine various variables to obtain the most favourable alternative. Level: 6, 7
7. Correlate input parameters for the model with model results. Level: 6, 7
8. Create a capital investment project feasibility model. Level: 6, 7
9. Critically evaluate various alternatives of a capital investment project. Level: 7
10. Prepare a feasibility study for a capital investment project. Level: 6, 7
11. Compare various alternatives and propose the most favourable one. Level: 6, 7
12. Defend position regarding selection of the most favourable alternative. Level: 7
13. Valorize individual alternatives. Level: 7

### Methods of carrying out lectures
- Ex cathedra teaching
- Case studies
- Discussion
- Questions and answers
- Other

Appropriate teaching aids (video projector and computer) will be used as appropriate in the presentation of lectures.

### Methods of carrying out auditory exercises
- Group problem solving
- Discussion, brainstorming
- Other

Capital project planning methodology and investment analyses are presented and illustrated based on a real-life example.

### Course content lectures
1. Investment policies of companies, 2h, Learning outcomes: 1, 2, 4, 8, 10
2. Investment program, 2h, Learning outcomes: 1, 3, 9, 10, 11, 12
3. Analysis of investment program factors, 2h, Learning outcomes: 1, 2, 7, 10
4. Analysis of investment program factors, 2h, Learning outcomes: 1, 2, 8, 9, 10
5. Investment decision, 2h, Learning outcomes: 3, 7, 11, 12
6. Sources of financing, 2h, Learning outcomes: 2, 9, 10
7. Investment schedule, 2h, Learning outcomes: 2, 3, 7, 8
8. Cost analysis and calculation in business operations, 2h, Learning outcomes: 1, 8, 9
9. Calculation and risk relationship in construction process, 2h, Learning outcomes: 1, 2, 3, 8, 9, 11, 13
10. Cost planning, 2h, Learning outcomes: 3, 13
11. Cost control, 2h, Learning outcomes: 2, 4, 11, 12
12. Investment efficiency, 2h, Learning outcomes: 1, 2, 5, 10, 11
13. Sensitivity analysis for investment programs (cost- benefit analysis), 2h, Learning outcomes: 2, 4, 10, 12
14. Final evaluation of investment programs, 2h, Learning outcomes: 1, 4, 7, 10, 11
15. Personnel policies, principal terms, human resources planning and management, 2h, Learning outcomes: 1, 2, 6, 8, 9

### Course content auditory
1. Project formulation, description of technological-technical elements of projects, location, market, sources of financing, total income distribution, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
2. Project formulation, description of technological-technical elements of projects, location, market, sources of financing, total income distribution, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
3. Project formulation, description of technological-technical elements of projects, location, market, sources of financing, total income distribution, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
4. Evaluation, liquidity analysis, economic justification analysis, analysis of efficiency and adequacy of investment projects, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
5. Evaluation, liquidity analysis, economic justification analysis, analysis of efficiency and adequacy of investment projects, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
6. Evaluation, liquidity analysis, economic justification analysis, analysis of efficiency and adequacy of investment projects, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
7. no classes, 2h
8. no classes, 2h
9. no classes, 2h
10. no classes, 2h
11. no classes, 2h
12. no classes, 2h
13. no classes, 2h
14. no classes, 2h
15. no classes, 2h

### Required materials
- Basic: classroom, blackboard, chalk...
- Whiteboard with markers
- Overhead projector
<table>
<thead>
<tr>
<th>Video equipment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students obligations</td>
<td>maximum of 3 absences from exercises</td>
</tr>
<tr>
<td>Knowledge evaluation during semester</td>
<td>Redovitost poha, kolokvij, numeri zadaci, kolokvij, teorijska pitanja, programski zadatak</td>
</tr>
<tr>
<td>Knowledge evaluation after semester</td>
<td>Written examination relating to the theory (lectures) and exercises (problems based on the assignment) Oral examination (for students who passed the written examination)</td>
</tr>
<tr>
<td>Remark</td>
<td>This course can be used for final thesis theme</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Proposal made by</td>
<td>prof.dr.sc. Saša Marenjak, 14.6.201</td>
</tr>
</tbody>
</table>
Legal Aspects of Construction Projects

3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

ECTS: 5.0

Academic year: 2017/2018

**Course content:**

**Ex cathedra teaching**
- Constitution, program of development in the Republic of Croatia, 2h, Learning outcomes:4,6,8
- Space planning in the Republic of Croatia, buildable land, implementation plans, 2h, Learning outcomes:3,8
- Investor, legitimacy, status, obligations, 2h, Learning outcomes:1,4,8
- Rights and obligations of participants in construction process, 2h, Learning outcomes:4,5,6,8
- Administrative documents and documentation (AD), 2h, Learning outcomes:2,5,8
- Location permit, building permit, 2h, Learning outcomes:1,2,6,8
- Plot plan, ownership, registration in land cadastre, 2h, Learning outcomes:3,6,8
- Participants in the AD production process, 2h, Learning outcomes:2,4,5,8
- Contracts and rights, 2h, Learning outcomes:1,5,7,8
- Classification of contracts, contract documents, contracting parties, 2h, Learning outcomes:2,8
- Construction contract, characteristics, price, calculation, 2h, Learning outcomes:3,5,8
- Supervision, final inspection, operating permit, 2h, Learning outcomes:2,3,8
- Registration of the facility in land register, 2h, Learning outcomes:3,6,8
- Certificate of occupancy, 2h, Learning outcomes:4,5,8
- European practice, 2h, Learning outcomes:2,3,8

**Case studies**
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8
- Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction., 1h, Learning outcomes:1,2,3,4,5,6,7,8

**Learning outcomes:**
1. evaluate each bid in the bidding procedure based on requirements specified in the bidding documents. Level:7
2. select the best bid based on specified criteria. Level:7
3. select contract model that is best suited to particular circumstances. Level:7
4. prepare and conduct the bidding procedure. Level:6,7
5. prepare (proposal/solution) instructions to bidders and contract text. Level:6,7
6. gather together all documents forming the bidding documentation and contract documentation. Level:6,7
7. compare bids according to specified criteria. Level:6,7
8. specify regulations that are applied during implementation of the project. Level:7

**Teaching mode:**
- Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

**Teachers:**
- Lectures:1. mr.sc. Željko Uhlir
- Lectures:2. mr.sc. Petar Adamović prof.v.škole

**Auditory exercises:**
- Group problem solving
- Discussion, brainstorming
- Other

**Other:**
- Appropriate teaching aids (video projector and computer) will be used as appropriate in the presentation of lectures.

**Learning activities:**
- Questions and answers
- Discussion
- Case studies
- Practical examples are analyzed and a particular emphasis is placed on appropriate legal procedures, documents and documentation, and on the related processes and correlations. The outcome of the exercises is the seminar paper.

**Academic year:** 2017/2018

**Study programme for academic year 2017/2018**
11. Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction. 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8

12. Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction. 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8

13. Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction. 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8

14. Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction. 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8

15. Analysis of applicable legal standards relating to the civil engineering and other areas directly linked with construction processes. In addition, all required documents and participants in construction process will be identified, including relationships among participants in construction. 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8

---

**Required materials**

- Basic: classroom, blackboard, chalk...
- Whiteboard with markers
- Overhead projector
- Video equipment

**Exam literature**

1. Zakon o gradenju
2. Simić-Bosanac: Građevinska regulativa; Centar za informacije i publicitet, Zagreb 1988
3. V.Gorenc, Privredno pravo-Ugovori, ŠK, Zagreb 1989

**Students obligations**

- maximum of 3 absences from exercises
- Redovitost pohaa#8#15#50$Kolokvij, teorijska pitanja#2#50#50$Programski zadatak#1#35#100$

**Knowledge evaluation during semester**

- Oral examination may be taken by students who successfully presented and justified the seminar paper.

**Remark**

This course can be used for final thesis theme

**Prerequisites:**

- No prerequisites.

**Proposal made by**

<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21782/22562</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name**: Management and Maintenance of Infrastructure Facilities and Buildings

**Status**: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

**Teachers**
- Lectures: Josip Čengija
- Lectures: dr. sc. Saša Marenjak
- Auditory exercises: Josip Čengija

**Course objectives**: Students will learn how to independently manage construction companies specializing in the management and maintenance of engineering structures and buildings.

**Learning outcomes**:
1. Integrate all costs in the model that is used to estimate building/structure maintenance costs. Level: 6, 7
2. Plan building/structure maintenance costs. Level: 6, 7
3. Establish a model for estimating building/structure maintenance costs. Level: 6, 7
4. Measure inputs needed to generate a model. Level: 7
5. Classify all costs to make them suitable for integration in the model. Level: 6, 7
6. Combine various technological solutions to obtain the most favourable solution from the aspect of total costs of living. Level: 6, 7
7. Develop a model for estimating the building/structure maintenance costs. Level: 6, 7
8. Create various alternatives for estimating the building/structure maintenance costs. Level: 6, 7
9. Manage the building/structure maintenance costs. Level: 6, 7
10. Reexamine each model alternative and its influence on maintenance costs. Level: 6, 7
11. Compare various model alternatives. Level: 6, 7
12. Define the most favourable model alternative. Level: 7
13. Select an optimum alternative that generates the lowest maintenance costs. Level: 7

**Methods of carrying out lectures**
- Ex cathedra teaching
- Case studies
- Discussion
- Questions and answers
- Other

Appropriate teaching aids (video projector and computer) will be used as appropriate in the presentation of lectures.

**Methods of carrying out auditory exercises**
- Group problem solving
- Essay writing
- Interactive problem solving
- Other

Topics needed for the preparation of the assignment (Building Maintenance and Rehabilitation Scheduling Project) are presented.

**Course content lectures**
1. Introduction and general terms, 2h, Learning outcomes: 1, 2, 3, 4, 5
2. General principles for the maintenance and rehabilitation of buildings and other facilities, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6
3. Distribution of costs over the entire life of the building/facility, 2h, Learning outcomes: 3, 4, 7, 8
4. Identification of building condition and causes of building disrepair, 2h, Learning outcomes: 3, 7, 10, 11
5. Service life of individual parts of a building/facility, 2h, Learning outcomes: 1, 3, 6, 9
6. Inventory of present condition, periodic controls, reports, 2h, Learning outcomes: 2, 6, 9, 11
7. Maintenance, maintenance plan, technology, costs, 2h, Learning outcomes: 1, 4, 6, 11, 12, 13
8. Maintenance, maintenance plan, technology, costs, 2h, Learning outcomes: 4, 6, 10, 11, 12
9. Maintenance resources (material, machines, personnel, money), 2h, Learning outcomes: 1, 2, 5, 8, 12
10. Building maintenance and rehabilitation scheduling project, 2h, Learning outcomes: 2, 3, 4, 8, 10
11. Quality assurance, 2h, Learning outcomes: 1, 5, 7, 8, 12, 13
12. Maintenance of buildings/facilities and maintenance of housing units, 2h, Learning outcomes: 5, 7, 9, 10, 12, 13
13. Organisation of building maintenance service, 2h, Learning outcomes: 1, 8, 9, 10, 11
14. Rehabilitation of buildings and infrastructure facilities, 2h, Learning outcomes: 5, 6, 7, 13
15. Building material recycling, 2h, Learning outcomes: 1, 4, 5, 6, 8

**Course content auditory**
1. Parts of the project for the maintenance and rehabilitation of buildings - identification of condition, maintenance or repair method, maintenance or repair costs, quality control, building management, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
2. Parts of the project for the maintenance and rehabilitation of buildings - identification of condition, maintenance or repair method, maintenance or repair costs, quality control, building management, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
3. Parts of the project for the maintenance and rehabilitation of buildings - identification of condition, maintenance or repair method, maintenance or repair costs, quality control, building management, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
4. Remedial work and rehabilitation of old buildings - floor structure, basement, roof structure, facade, with examples from building practice, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
5. Moisture and causes of moisture occurrence in buildings, remedial measures, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
6. Roof repair technology with an emphasis on flat roof repair, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
7. No classes, 2h
8. No classes, 2h
9. No classes, 2h
10. No classes, 2h
11. No classes, 2h
12. No classes, 2h
13. No classes, 2h
14. No classes, 2h
15. no classes, 2h

<table>
<thead>
<tr>
<th>Required materials</th>
<th>Basic: classroom, blackboard, chalk...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whiteboard with markers</td>
</tr>
<tr>
<td></td>
<td>Overhead projector</td>
</tr>
<tr>
<td></td>
<td>Video equipment</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Students obligations</th>
<th>maximum of 3 absences from exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge evaluation during semester</td>
<td>Redovitost poha#100#0#75$Kolokvij, numeri zadaci#1#35#50$Kolokvij, teorijska pitanja#1#35#50$Programski zadatak#1#30#100$</td>
</tr>
</tbody>
</table>

| Knowledge evaluation after semester | Written examination relating to theory (lectures) and exercises (solving tasks in relation with the assignment "Building Maintenance and Rehabilitation Scheduling Project"). Oral examination (to be taken by students who successfully passed the written examination). |

| Remark | This course can be used for final thesis theme |

| Prerequisites: | No prerequisites. |

| Proposal made by | prof.dr.sc. Saša Marenjak, 15.6.2012 |
### Course Information

**Code WEB/ISVU**: Z1879/63914

**ECTS**: 6.0

**Academic year**: 2017/2018

**Name**: Mathematics

**Status**: 1st semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course

**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

**Credit Hours**: 30+30 (30+0+0+0)

**ECTS**: 120

**Teachers**
- Lectures: 1. mr. sc. Reni Banov dipl. ing. mat.
- Lectures: 2. dr. sc. Mandi Orlić Bachler prof. mat. i inf.
- Lectures: 3. Ivana Božić Dragun dipl.prof.mat.
- Auditory exercises: mr. sc. Reni Banov dipl. ing. mat.
- Auditory exercises: dr. sc. Mandi Orlić Bachler prof. mat. i inf.

**Course objectives**
- acquiring basic knowledge in differential and integral calculus of real functions of several real variables

**Learning outcomes**:
1. sketch natural domains of functions of two variables. Level: 6
2. sketch contour lines of functions of two variables. Level: 6
3. find first and second order partial derivatives of functions of two variables. Level: 6
4. determine tangent planes on graphs of functions of two variables. Level: 6, 7
5. estimate errors using partial derivatives. Level: 6, 7
6. determine local extrema of functions of two variables. Level: 6, 7
7. solve optimization problems using local extrema. Level: 6
8. solve double integrals in Cartesian coordinates. Level: 6
9. find volumes and areas using double integrals. Level: 6
10. solve triple integrals in Cartesian coordinates. Level: 6
11. solve double integrals in polar coordinates. Level: 6
12. solve triple integrals in cylindrical and spherical coordinates. Level: 6
13. find masses and centres of gravity using multiple integrals. Level: 6

**Methods of carrying out lectures**
- Ex cathedra teaching

**Methods of carrying out auditory exercises**
- Group problem solving

**Course content lectures**
1. Functions of several variables, 2h, Learning outcomes: 1
2. Graphical representation of functions of several variables, 2h, Learning outcomes: 2
3. Partial derivatives, 2h, Learning outcomes: 3
4. Tangent plane, 2h, Learning outcomes: 4
5. Application of partial derivatives to error estimation, 2h, Learning outcomes: 5
6. Local extrema of functions of several variables, 2h, Learning outcomes: 6, 7
7. Midterm exam, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
8. Double integral, 2h, Learning outcomes: 8
9. Using double integrals to find volumes and areas, 2h, Learning outcomes: 9
10. Triple integral, 2h, Learning outcomes: 10
11. Double integrals in polar coordinates, 2h, Learning outcomes: 11
12. Triple integrals in cylindrical and spherical coordinates, 2h, Learning outcomes: 12
13. Applications of multiple integrals in physics, 2h, Learning outcomes: 13
14. Final written exam, 2h, Learning outcomes: 8, 9, 10, 11, 12, 13
15. Final oral exam, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Course content auditory**
1. Functions of several variables, 2h, Learning outcomes: 1
2. Graphical representation of functions of several variables, 2h, Learning outcomes: 2
3. Partial derivatives, 2h, Learning outcomes: 3
4. Tangent plane, 2h, Learning outcomes: 4
5. Application of partial derivatives to error estimation, 2h, Learning outcomes: 5
6. Local extrema of functions of several variables, 2h, Learning outcomes: 6, 7
7. Midterm exam, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
8. Double integral, 2h, Learning outcomes: 8
9. Using double integrals to find volumes and areas, 2h, Learning outcomes: 9
10. Triple integral, 2h, Learning outcomes: 10
11. Double integrals in polar coordinates, 2h, Learning outcomes: 11
12. Triple integrals in cylindrical and spherical coordinates, 2h, Learning outcomes: 12
13. Applications of multiple integrals in physics, 2h, Learning outcomes: 13
14. Final written exam, 2h, Learning outcomes: 8, 9, 10, 11, 12, 13
15. Final oral exam, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Required materials**
- Basic: classroom, blackboard, chalk...

**Exam literature**

**Additional literature**

**Students obligations**
It is required to achieve at least 30 points during the semester.

**Knowledge evaluation during semester**
- During the semester it is possible to achieve a maximum of 60 points, as follows:
  - course completed: 30 points,
  - tests: 30 points.
<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
<th>By achieving at least 45 points, a student is qualified for the oral exam, which is obligatory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remark</td>
<td>At the exam it is possible to achieve a maximum of 40 points. The exam consists of written (for students with less than 45 points achieved during the semester) and oral part.</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>This course can not be used for final thesis theme</td>
</tr>
<tr>
<td>ISVU equivalents:</td>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Proposal made by</td>
<td>22656;63913;63915;</td>
</tr>
<tr>
<td>Proposal made by</td>
<td>T. Perkov, M. Orlić Bachler, 11. 5. 2016.</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
<td>ECTS</td>
</tr>
<tr>
<td>---------------</td>
<td>------</td>
</tr>
<tr>
<td>21777/22556</td>
<td>7.0</td>
</tr>
</tbody>
</table>

**Name**
Modern Construction Technologies

**Status**
2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**
Lectures + exercises (auditory + laboratory + seminar + methodology + construction)

**Teachers**

**Course objectives**
Students will learn how to recognise problems encountered during construction, especially during preparations for construction work, special works in the soil, concrete works, scaffolding and formwork, and assembly work. Students will also learn how to independently solve technological issues on construction sites, how to adequately communicate with designers and others participants in the construction process, and how to manage the construction work, including finding solution to everyday site problems.

**Methods of carrying out lectures**
Ex cathedra teaching
Case studies
Simulations
Modelling
Discussion
Questions and answers
Other

In the scope of the lectures, students will continuously be presented technological processes through drawings, photographs, films and video recordings from real-life construction sites. Students are expected to take part in discussions relating to problems and issues to be solved by a particular technological system.

**Methods of carrying out auditory exercises**
Group problem solving
Discussion, brainstorming
Other

Problems are solved on the blackboard.

**Course content lectures**
1. Technological equipment for demolition of civil engineering structures, 2h, Learning outcomes:3,4,6
2. Technological equipment for demolition of civil engineering structures, 2h, Learning outcomes:3,4,6
3. Technique, technology and logistics for construction waste disposal, 2h, Learning outcomes:4,6
4. Technique, technology and logistics for construction waste disposal, 2h, Learning outcomes:4,6
5. Technological equipment for construction waste recycling, 2h, Learning outcomes:4,6
6. Technique and technology for the construction of buried pipelines microtunnelling, 2h, Learning outcomes:9
7. Technique and technology for the construction of buried pipelines microtunnelling, 2h, Learning outcomes:9
8. Transported concrete logistics, 2h, Learning outcomes:6,8
9. Transported concrete logistics, 2h, Learning outcomes:6,8
10. Logistics of modern formwork and scaffolding systems, 2h, Learning outcomes:6,8
11. Logistics of modern formwork and scaffolding systems, 2h, Learning outcomes:6,8
12. Logistics of modern formwork and scaffolding systems, 2h, Learning outcomes:6,8
13. Formwork costs, 2h, Learning outcomes:6
14. Prefabrication costs, 2h, Learning outcomes:1,2
15. Prefabrication costs, 2h, Learning outcomes:1,2

**Course content auditory**
1. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
2. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
3. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
4. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
5. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
6. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
7. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
8. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
9. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
10. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
11. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
12. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
13. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
14. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
15. Detailed presentation of the program from which the seminar paper is selected., 2h, Learning outcomes:1,2,3,4,5,6,7,8,9
### 13. Detailed presentation of the program from which the seminar paper is selected.
- Duration: 2h
- Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9

### 14. Detailed presentation of the program from which the seminar paper is selected.
- Duration: 2h
- Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9

### 15. Detailed presentation of the program from which the seminar paper is selected.
- Duration: 2h
- Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9

### Required materials
- **Basic:** classroom, blackboard, chalk...
- **General purpose computer laboratory**
- Whiteboard with markers
- Overhead projector
- Portable overhead projector
- Video equipment

### Exam literature
2. R. Lončarić: Organizacija izvedbe graditeljskih projekata, HDGI, 1995,
3. bilješke s predavanja i materijali dobiveni na predavanjima i vježbama (uvezana predavanja kompletna)

1. V. Mlinarić, R. Lončarić: Vrednovanje oplatnih sustava, Građevinar, Zagreb, 51(1999)2,
2. instalirana verzije računalnih programa (softwari) za korištenje u nastavi pri izradi programa, seminarskih i diplomskih radova:
   - DOKA, The planing system for Doka formwork
   - PERI, PERI ELPOS die schnelle Schalungspilsnung
3. WWW.grad.hr - djelatnici - dr.sci. Zdravko Linarić #8594; Dokumenti raspoloživi za download:
   - Postrojenja za proizvodnju gradiva, I.dio, Tvornice betona (betonare)
   - Izbor strojeva i planiranje strojnog rada u gradenju

### Students obligations
- Maximum of 3 absences from exercises

### Knowledge evaluation during semester
- Kolokvij, teorijska pitanja #2 #100 #50
- Programski zadatak #1 #0 #100

### Knowledge evaluation after semester
- Oral portion of the examination (to verify knowledge acquired by students)

### Remark
- This course can be used for final thesis theme

### Prerequisites:
- No prerequisites.

### Proposal made by
- Boris Uremović dipl. ing. grad., 13.6.2012
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21785/22565</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name**: Modern Methods in Geotechnical Engineering

**Status**: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

**Total**: 30+24 (0+22+2+0) 126

**Teachers**
- Laboratory exercises: Ivana Pavlić
- Seminar exercises: Ivana Pavlić

**Course objectives**: Students will be sensitized to the significance of measurement in geotechnical engineering, and will be allowed to take part in the design process, which will provide them with good foundations for independent design in their professional work.

**Learning outcomes**:
1. estimate slope stability according to a given geotechnical report. Level: 6,7
2. propose slope geometry with a satisfactory safety level. Level: 6,7
3. design foundations for a building or a similar structure. Level: 6,7
4. design a free-standing retaining wall. Level: 6,7
5. estimate danger of a hydraulic failure at the foundation pit bottom. Level: 6,7
6. propose method for reducing danger of hydraulic failure at the foundation pit bottom. Level: 6,7

**Methods of carrying out lectures**
- Ex cathedra teaching
- Guest lecturer
- Case studies
- Demonstration
- Discussion
- Questions and answers
- Seminar, students presentation and discussion
- Homework presentation
- Other

Sites of geotechnical investigations are visited, as well as construction sites. Written materials are given to students in advance, but students are required active cooperation in the class. Best geotechnicians are invited to lectures according to topics. Active Learning Critical Thinking frame is used.

**Methods of carrying out laboratory exercises**
- Laboratory exercises on laboratory equipment
- Group problem solving
- Traditional literature analysis
- Data mining and knowledge discovery on the Web
- Essay writing
- Students take part in geotechnical investigation in situ. For some of the same samples (or others) students perform laboratory tests.

**Methods of carrying out seminars**
- Students prepare part of geotechnical report after their own investigation and present it for the group.

**Course content lectures**
1. Introduction. Stresses in soil and influence of water., 4h, Learning outcomes: 1,2,3,4,5,6
2. Role of Engineering Geology. Rock Mechanics., 4h, Learning outcomes: 1,2,3,4,5
3. Geotechnical investigation., 4h, Learning outcomes: 1,2,3,4,5
4. Slope stability., 4h, Learning outcomes: 1,2
5. Shallow and deep foundations., 4h, Learning outcomes: 3
6. Retaining structures., 4h, Learning outcomes: 4
7. Hydraulic failure., 4h, Learning outcomes: 5
8. Deep excavations., 2h, Learning outcomes: 4,5,6
   9.
   10.
   11.
   12.
   13.
   14.
   15.

**Course content laboratory**
1. In situ investigation., 4h, Learning outcomes: 1,2,3,4,5,6
2. Geotechnical laboratory., 4h, Learning outcomes: 1,2,3,4,5,6
   3.
   4.
   5.
   6.
   7.
   8.
   9.
   10.
   11.
   12.
   13.
   14.
   15.

**Course content seminars**
1. izrada i prezentacija vlastitih ispitivanja u obliku dijela geotehničkog izvješća. (2 sata)

**Required materials**
- Basic: classroom, blackboard, chalk...
- Special purpose laboratory
| Exam literature | Duboko temeljnje i poboljšanje temeljnog tla / Tanja Roje-Bonacci  
| Potporne građevine i građevne jame / Tanja Roje-Bonacci  
| Roje-Bonacci, Tanja, 2012 Zemljani radovi, Split : Sveučilište u Splitu, Fakultet građevinarstva, arhitekture i geodezije |

| Students obligations | ... |
| Knowledge evaluation during semester | 4 assignments (foundation, retaining wall, slope, hydraulic failure) + written exam + oral exam. |
| Knowledge evaluation after semester | 4 assignments (foundation, retaining wall, slope, hydraulic failure) + written exam + oral exam. |

<p>| Remark | This course can be used for final thesis theme |
| Prerequisites: | No prerequisites. |</p>
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1792/22574</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name:** Modern Methods in Geotechnical Engineering

**Status:** 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode:** Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home

**Teachers:**
- Lectures: Dr. sc. Sonja Zlatović, prof. v. šk.
- Laboratory exercises: Dr. sc. Sonja Zlatović, prof. v. šk.

**Course objectives:** Students will be sensitized to the significance of measurement in geotechnical engineering, and will be allowed to take part in the design process, which will provide them with good foundations for independent design in their professional work.

**Learning outcomes:**
1. estimate stability of slope based on the corresponding geotechnical report. Level: 6, 7
2. propose slope geometry with a satisfactory safety level. Level: 6, 7
3. design foundations for a building or a similar structure. Level: 6, 7
4. design a free-standing retaining wall. Level: 6, 7
5. estimate danger of a hydraulic failure at the foundation pit bottom. Level: 6, 7
6. propose method for reducing danger of hydraulic failure at the foundation pit bottom. Level: 6, 7

**Methods of carrying out lectures:** Sites of geotechnical investigations are visited, as well as construction sites. Written materials are given to students in advance, but students are required active cooperation in the class. Best geotechnicians are invited to lectures according to topics. Active Learning Critical Thinking frame is used.

**Methods of carrying out laboratory exercises:**
- Laboratory exercises on laboratory equipment
- Group problem solving
- Traditional literature analysis
- Data mining and knowledge discovery on the Web
- Essay writing
- Students take part in geotechnical investigation in situ. For some of the same samples (or others) students perform laboratory tests.

**Methods of carrying out seminars:**
- Students prepare part of geotechnical report after their own investigation and present it for the group.

**Course content lectures**
1. Introduction. Stresses in soil and influence of water., 4h, Learning outcomes: 1, 2, 3, 4, 5
2. Role of Engineering Geology. Rock Mechanics., 4h, Learning outcomes: 1, 2, 3, 4, 5
3. Geotechnical investigation., 4h, Learning outcomes: 1, 2, 3, 4, 5
4. Slope stability., 4h, Learning outcomes: 1, 2
5. Shallow and deep foundations., 4h, Learning outcomes: 3
6. Retaining structures., 4h, Learning outcomes: 4
7. Hydraulic failure., 4h, Learning outcomes: 5
8. Deep excavations., 2h, Learning outcomes: 4, 5, 6
9. 10.
11. 12.
15.

**Course content laboratory**
1. In situ investigation., 4h, Learning outcomes: 1, 2, 3, 4, 5, 6
2. Geotechnical laboratory., 4h, Learning outcomes: 1, 2, 3, 4, 5, 6
3. 4.
5. 6., 2h
7. 8.
9. 10.
11. 12.
15.

**Course content seminars**
- Izrada i prezentacija vlastitih ispitivanja u obliku dijela geotehničkog izvješća. (2 sata)

**Required materials**
- Basic: classroom, blackboard, chalk...
- Special purpose laboratory
- Overhead projector
- Special equipment
- oedometer, direct shear apparatus

**Exam literature**
- Roje-Bonacci, Tanja, 2012 Zemljani radovi, Split : Sveučilište u Splitu, Fakultet građevinarstva, arhitekture i geodezije
- Nonveiller, E, 1981, Mehanika tla. Temeljenje građevina, Školska knjiga, Zagreb
- Towhata, Ikuo, 2008, Geotechnical Earthquake Engineering, Springer

**Students obligations**

**Knowledge evaluation during**
4 assignments (foundation, retaining wall, slope, hydraulic failure) + written exam + oral exam.
<p>| <strong>semester</strong> | 4 assignments (foundation, retaining wall, slope, hydraulic failure) + written exam + oral exam. |
| <strong>Remark</strong> | This course can be used for final thesis theme |
| <strong>Prerequisites:</strong> | No prerequisites. |
| <strong>Proposal made by</strong> | dr.sc. Sonja Zlatović, prof.v.šk., 11.02.2014. |</p>
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21797/22580</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

Name: Modern Methods in Geotechnical Engineering

Status: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

Teaching mode: Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home

ECTS: 30+16 (0+14+2+0) 134

Teachers:
- Laboratory exercises: dr.sc. Sonja Zlatović, prof.v.šk.

Course objectives: Students will be sensitized to the significance of measurement in geotechnical engineering, and will be allowed to take part in the design process, which will provide them with good foundations for independent design in their professional work.

Learning outcomes:
1. estimate stability of slope based on the corresponding geotechnical report. Level: 6, 7
2. propose slope geometry with a satisfactory safety level. Level: 6, 7
3. design foundations for a building or a similar structure. Level: 6, 7
4. design a free-standing retaining wall. Level: 6, 7
5. estimate danger of a hydraulic failure at the foundation pit bottom. Level: 6, 7
6. propose method for reducing danger of hydraulic failure at the foundation pit bottom. Level: 6, 7

Methods of carrying out lectures:
- Ex cathedra teaching
- Guest lecturer
- Case studies
- Demonstration
- Discussion
- Questions and answers
- Seminar, students presentation and discussion
- Homework presentation
- Other

Sites of geotechnical investigations are visited, as well as construction sites. Written materials are given to students advance, but students are required active cooperation in the class. Best geotechnicians are invited to lectures according to topics. Active Learning Critical Thinking frame is used.

Methods of carrying out laboratory exercises:
- Laboratory exercises on laboratory equipment
- Group problem solving
- Traditional literature analysis
- Data mining and knowledge discovery on the Web
- Essay writing
- Students take part in geotechnical investigation in situ. For some of the same samples (or others) students perform laboratory tests.

Methods of carrying out seminars:
- Students prepare part of geotechnical report after their own investigation and present it for the group.

Course content lectures:
1. Introduction. Stresses in soil and influence of water., 4h, Learning outcomes: 1, 2, 3, 4, 5, 6
2. Role of Engineering Geology. Rock Mechanics., 4h, Learning outcomes: 1, 2, 3, 4, 5
3. Geotechnical investigation., 4h, Learning outcomes: 1, 2, 3, 4, 5
4. Slope stability., 4h, Learning outcomes: 1, 2
5. Shallow and deep foundations., 4h, Learning outcomes: 3, 4, 5
6. Retaining structures., 4h, Learning outcomes: 4, 5
7. Hydraulic failure., 4h, Learning outcomes: 5, 6
8. Deep excavations., 2h, Learning outcomes: 1, 2, 3, 4, 5, 6
9.
10.
11.
12.
13.
14.
15.

Course content laboratory:
1. In situ investigation., 4h, Learning outcomes: 1, 2, 3, 4, 5, 6
2. Geotechnical laboratory., 4h, Learning outcomes: 1, 2, 3, 4, 5, 6
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.

Course content seminars:
- Izrada i prezentacija vlastitih ispitivanja u obliku dijela geotehničkog izvješća. (2 sata)

Required materials:
- Basic: classroom, blackboard, chalk...
- Special purpose laboratory
<table>
<thead>
<tr>
<th>Exam literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonveiller, E., 1981, Mehanika tla. Temeljenje građevina, Skolska knjiga, Zagreb</td>
</tr>
<tr>
<td>Towhata, Ikuo, 2008, Geotechnical Earthquake Engineering, Springer</td>
</tr>
<tr>
<td>Roje-Bonacci, Tanja, 2012 Zemljani radovi, Split : Sveučilište u Splitu, Fakultet građevinarstva, arhitekture i geodezije</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students obligations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge evaluation during semester</td>
</tr>
<tr>
<td>4 assignments (foundation, retaining wall, slope, hydraulic failure) + written exam + oral exam.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 assignments (foundation, retaining wall, slope, hydraulic failure) + written exam + oral exam.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course can be used for final thesis theme</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No prerequisites.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposal made by</th>
</tr>
</thead>
<tbody>
<tr>
<td>dr.sc. Sonja Zlatović, prof.v.šk., 11.02.2014.</td>
</tr>
</tbody>
</table>
Zagreb University of Applied Sciences  
Study programme for academic year 2017/2018

---

**Code** WEB/ISVU: 21786/22566  
**ECTS** : 3.0  
**Academic year** : 2017/2018

**Name** : Pavement Structures  
**Status** : 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode** : Lectures + exercises (auditory + laboratory + seminar + metodology + construction)  
**work at home** : 15+5 (5+0+0+0)  
**work at home** : 70

**Teachers**  
Lectures: 1. doc.dr.sc. Miroslav Šimun dipl.ing.građ.  
Auditory exercises: Sandra Mihalinac mag.ing.aedif.  
Auditory exercises: doc.dr.sc. Miroslav Šimun dipl.ing.građ.

**Course objectives**  
This course is aimed at providing students with theoretical and practical knowledge relating to the planning, types, realization (construction) and maintenance of pavement structures.

**Learning outcomes**:
1. create a pavement structure dimensioning report. Level:6,7  
2. design a new asphalt or concrete pavement structure. Level:6,7  
3. critically analyse various pavement structure alternatives. Level:7  
4. combine various materials in a composite pavement structure. Level:6,7  
5. standardise technical conditions for the realization of pavement structures. Level:6,7  
6. propose various pavement structure alternatives. Level:6,7  
7. recommend an optimum pavement structure alternative from the technical and economic aspects. Level:7  
8. valorise bills of quantities for various pavement structures. Level:7

**Methods of carrying out lectures**  
Ex cathedra teaching  
Case studies  
Discussion  
Questions and answers  
Other  
Appropriate teaching aids (video projector) will be used as appropriate during theoretical presentation of course material.

**Methods of carrying out auditory exercises**  
Pavement structure design procedures are presented and quality condition of layers.

**Course content lectures**
1. History of road construction and modern pavement structure systems, 1h, Learning outcomes:3,4  
2. Reference traffic loads and other factors influencing composition of pavement structures, 1h, Learning outcomes:1,2  
3. Methods for dimensioning new and strengthening existing pavement structures, 1h, Learning outcomes:1,2,3,4,5,6,7,8  
4. Methods for dimensioning new and strengthening existing pavement structures, 1h, Learning outcomes:1,2,3,4,5,6,7,8  
5. Methods for dimensioning new and strengthening existing pavement structures, 1h, Learning outcomes:1,2,3,4,5,6,7,8  
6. Subgrade, preparation and quality control, and subgrade stabilisation procedures, 1h, Learning outcomes:2,3,4,7,8  
7. Subgrade, preparation and quality control, and subgrade stabilisation procedures, 1h, Learning outcomes:2,3,4,7,8  
8. Base courses made of loose compacted stone materials, 1h, Learning outcomes:1,2,4,5  
9. Base course made of cement-stabilised granular stone materials, 1h, Learning outcomes:1,2,4,5  
10. Asphalt layers base course, binder, and wearing course, 1h, Learning outcomes:1,2,4,5  
11. Asphalt mixes, 1h, Learning outcomes:1,2,4,5  
12. Surface properties of pavement structures, 1h, Learning outcomes:3,4,5,7  
13. Types of asphalt pavement damage, 1h, Learning outcomes:4,5,7,8  
14. Maintenance of asphalt pavement structures with practical examples, 1h, Learning outcomes:3,4,5,6,7,8  
15. Asphalt pavement recycling with practical examples, 1h, Learning outcomes:3,4,5,6,7,8

**Course content auditory**
1. Metode za dimenzioniranje novih i postojećih kolnih konstrukcija, 1h, Learning outcomes:1,2,3,4,5,6,7,8  
2. Metode za dimenzioniranje novih i postojećih kolnih konstrukcija, 1h, Learning outcomes:1,2,3,4,5,6,7,8  
3. Subgrade, preparation and quality control, and subgrade stabilisation procedures, 1h, Learning outcomes:2,3,4,7,8  
4. Subgrade, preparation and quality control, and subgrade stabilisation procedures, 1h, Learning outcomes:2,3,4,7,8  
5. Base courses made of loose compacted stone materials, 1h, Learning outcomes:1,2,4,5  
6. Base courses made of loose compacted stone materials, 1h, Learning outcomes:1,2,4,5  
7. Base course made of cement-stabilised granular stone materials, 1h, Learning outcomes:1,2,4,5  
8. Base course made of cement-stabilised granular stone materials, 1h, Learning outcomes:1,2,4,5  
9. Asphalt layers base and binder course, 1h, Learning outcomes:1,2,4,5  
10. Asphalt layers wearing course, 1h, Learning outcomes:1,2,4,5  
11. Asphalt mixes, 1h, Learning outcomes:1,2,4,5  
12. Surface properties of pavement structures and types of asphalt pavement damage, 1h, Learning outcomes:3,4,5,7  
13. Use of geosynthetics in road construction, 1h, Learning outcomes:4,5,7,8  
14. Maintenance of asphalt pavement structures with practical examples, 1h, Learning outcomes:3,4,5,6,7,8  
15. Asphalt pavement recycling with practical examples, 1h, Learning outcomes:3,4,5,6,7,8

**Students obligations**  
maximum of 3 absences from exercises

**Student activities**
Course content

1. INTRODUCTION (basic terms relating to preservation of monument heritage), 1h, Learning outcomes: 1, 4, 9
2. CULTURAL MONUMENT PRESERVATION THEORIES (Italy, Austria, England, Croatia), documents, 1h, Learning outcomes: 1, 4, 9
3. PRESERVATION OF MONUMENTS IN THE 20TH CENTURY (Croatia), 1h, Learning outcomes: 1, 4, 9
4. ORGANISATION OF CULTURAL MONUMENT PRESERVATION SERVICES (Croatia - Ministry of Culture, Office for the Preservation of Cultural Monuments, Historic Preservation Departments, UNESCO, ICOMOS, monument heritage - movable cultural heritage, immovable cultural heritage, archaeological zones, architectural heritage, garden and park heritage, nature monuments), 1h, Learning outcomes: 1, 4, 9
5. MONUMENT HERITAGE DOCUMENTATION (document archiving methods, photograph archive, plan archive), 1h, Learning outcomes: 1, 2, 3, 4, 9
6. MONUMENT HERITAGE INVESTIGATIONS (monument heritage inventory - architectural survey, investigation work on monument sites, archive documents - historic preservation study), 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9
7. VALORISATION OF HERITAGE I (interdisciplinary character - integrated approach to the preservation of monument heritage), 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9
8. VALORISATION OF HERITAGE II (design documents - treatment and presentation, physical planning treatment), 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9
9. PRESERVATION TERMS I (relationship between heritage and: architecture and town planning, painting and sculpture, music, plastic arts, design, photography, textile, finishing trades), 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9
10. PRINCIPLES OF PRESERVATION AND REHABILITATION OF HISTORIC MONUMENTS I (registration, preservation regulations, preservation principles), 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9
11. PRINCIPLES OF PRESERVATION AND REHABILITATION OF HISTORIC MONUMENTS II (methodology and techniques for monument heritage investigations and valorisation), 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9
<table>
<thead>
<tr>
<th>Course content</th>
<th>auditoriy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cultural-historic heritage and environment, 1h, Learning outcomes: 4,5,6,7,9</td>
<td></td>
</tr>
<tr>
<td>2. Cultural-historic heritage and environment, 1h, Learning outcomes: 4,5,6,7,9</td>
<td></td>
</tr>
<tr>
<td>3. Document management methods, 1h, Learning outcomes: 1,2,3,9</td>
<td></td>
</tr>
<tr>
<td>4. Investigations, 1h, Learning outcomes: 1,2,3,4,5,6,9</td>
<td></td>
</tr>
<tr>
<td>5. Investigations, 1h, Learning outcomes: 1,2,3,4,5,6,9</td>
<td></td>
</tr>
<tr>
<td>6. Valorisation, 1h, Learning outcomes: 4,5,6,7,9</td>
<td></td>
</tr>
<tr>
<td>7. Valorisation, 1h, Learning outcomes: 4,5,6,7,9</td>
<td></td>
</tr>
<tr>
<td>8. Rehabilitation principles and methodology, 1h, Learning outcomes: 5,6,7,8,9</td>
<td></td>
</tr>
<tr>
<td>9. Rehabilitation principles and methodology, 1h, Learning outcomes: 5,6,7,8,9</td>
<td></td>
</tr>
<tr>
<td>10. Cultural heritage economy, 1h, Learning outcomes: 5,6,7,8,9</td>
<td></td>
</tr>
<tr>
<td>11. Cultural heritage economy, 1h, Learning outcomes: 3,4,5,6,7,8,9</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic: classroom, blackboard, chalk...</td>
</tr>
<tr>
<td>Whiteboard with markers</td>
</tr>
<tr>
<td>Overhead projector</td>
</tr>
<tr>
<td>Portable overhead projector</td>
</tr>
<tr>
<td>Video equipment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exam literature</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Students obligations</th>
</tr>
</thead>
<tbody>
<tr>
<td>maximum of 3 absences from exercises</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation during semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redovitost pohaa#10#0#60$Seminarski rad#1#100#100$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination (for students who did not meet seminar paper requirements) - synthesized interpretation of a thematic field relating to heritage and environment preservation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course can be used for final thesis theme</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>21905/78320</td>
</tr>
</tbody>
</table>

**Name**: Probability and Statistics

**Status**: 1st semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course

**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

**Teachers**
- Lectures: 1. dr.sc. Mandić Orlić Bachler prof. mat. i inf.
- Auditory exercises: dr sc. Mandić Orlić Bachler prof. mat. i inf.
- Laboratory exercises: dr sc. Mandić Orlić Bachler prof. mat. i inf.

**Course objectives**: acquiring basic knowledge in probability and statistical data analysis

**Learning outcomes**:
1. calculate probabilities of events using classical definition of probability. Level: 6
2. calculate probabilities using sum rule. Level: 6
3. calculate conditional probabilities. Level: 6
4. calculate probabilities using the law of total probability. Level: 6
5. determine expected values, variances and standard deviations of discrete random variables. Level: 6
6. distinguish between discrete and continuous random variables. Level: 6
7. calculate probabilities in normal distribution. Level: 6
8. distinguish between populations and samples. Level: 6
9. sketch histograms and frequency polygons. Level: 6
10. find sample means and unbiased sample variances. Level: 6
11. find confidence intervals for means. Level: 6
12. find confidence intervals for variances. Level: 6
13. accept or reject statistical hypotheses. Level: 6, 7

**Methods of carrying out lectures**: Ex cathedra teaching

**Methods of carrying out auditory exercises**: Group problem solving

**Methods of carrying out laboratory exercises**: Laboratory exercises on laboratory equipment

**Course content lectures**
1. Classical definition of probability, 1h, Learning outcomes: 1
2. Operations on events, 1h, Learning outcomes: 2
3. Conditional probability, 1h, Learning outcomes: 3
4. Total probability, 1h, Learning outcomes: 4
5. Discrete random variables, 1h, Learning outcomes: 5
6. Continuous random variables, 1h, Learning outcomes: 6, 7
7. Midterm exam, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
8. Statistical population and random sample, 1h, Learning outcomes: 8
9. Graphical representation of statistical data, 1h, Learning outcomes: 9
10. Estimators, 1h, Learning outcomes: 10
11. Confidence intervals for means, 1h, Learning outcomes: 11
12. Confidence intervals for variances, 1h, Learning outcomes: 12
13. Hypotheses testing, 1h, Learning outcomes: 13
14. Final written exam, 1h, Learning outcomes: 8, 9, 10, 11, 12, 13
15. Final oral exam, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Course content auditory**
1. Classical definition of probability, 1h, Learning outcomes: 1
2. Operations on events, 1h, Learning outcomes: 2
3. Conditional probability, 1h, Learning outcomes: 3
4. Total probability, 1h, Learning outcomes: 4
5. Discrete random variables, 1h, Learning outcomes: 5
6. Continuous random variables, 1h, Learning outcomes: 6, 7
7. Midterm exam, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
8. Statistical population and random sample, 1h, Learning outcomes: 8
9. Graphical representation of statistical data, 1h, Learning outcomes: 9
10. Estimators, 1h, Learning outcomes: 10, 11, 12
11. Hypotheses testing, 1h, Learning outcomes: 13
12.-
13.-
14. Final written exam, 1h, Learning outcomes: 8, 9, 10, 11, 12, 13
15. Final oral exam, 1h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Course content laboratory**
1.-
2.-
3.-
4.-
5.-
6.-
7.-
8.-
9.-
10.-
11.-
12. Using computers in statistics, 1h, Learning outcomes: 10, 11, 12
13. Hypotheses testing, 1h, Learning outcomes: 13
| Required materials | Basic: classroom, blackboard, chalk...  
|                    | General purpose computer laboratory |
|                    | Additional literature:  
| Students obligations | It is required to achieve at least 30 points during the semester. |
| Knowledge evaluation during semester | During the semester it is possible to achieve a maximum of 60 points, as follows:  
|                    | - course completed: 30 points,  
|                    | - tests: 25 points,  
|                    | - solving problems in class: 5 points.  
<p>|                    | By achieving at least 40 points, a student is qualified for the oral exam, which is obligatory. |
| Knowledge evaluation after semester | At the exam it is possible to achieve a maximum of 40 points. The exam consists of written (for students with less then 40 points achieved during the semester) and oral part. |
| Remark | This course can not be used for final thesis theme |
| Prerequisites: | No prerequisites. |
| ISVU equivalents: | 22657;78321;78322;85754;122018;132263;161639; |
| Proposal made by | T. Perkov, M. Orlić Bachler, 27. 5. 2015. |</p>
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>21882/63917</th>
<th>ECTS</th>
<th>5.0</th>
<th>Academic year</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Project Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>1st semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching mode</td>
<td>Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home</td>
<td>30+15 (11+0+4+0)</td>
<td>105</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Teachers      | Lectures:1. mr.sc. Petra Gracin  
Lectures:2. mr.sc. Petar Adamović prof.v.škole  
Auditory exercises:mr.sc. Petra Gracin  
Seminar exercises:mr.sc. Petra Gracin |      |     |               |           |
| Course objectives | Students will master basic elements of project-oriented management of business, production, and service processes. |      |     |               |           |
| Learning outcomes: | 1. formulate/define the project management concept under conditions of uncertainty and limitations in time and resources. Level:6,7  
2. select a competent team for project realization. Level:7  
3. define an optimum organizational structure for project realization. Level:6,7  
4. plan time and resources for project realization. Level:6,7  
5. predict project implementation objectives and results under conditions of uncertainty. Level:6,7  
6. prepare tasks for the project team. Level:6,7  
7. evaluate project risks. Level:6,7  
8. assign roles, tasks, duties and responsibilities of each member of the project team. Level:6,7  
9. manage project to achieve objectives within the specified scope under continuously varying conditions. Level:6,7  
10. manage project team during implementation of the project. Level:6,7 |      |     |               |           |
| Methods of carrying out lectures | Ex cathedra teaching  
Case studies  
Discussion  
Questions and answers  
Other | The whole material is presented in lectures illustrated by drawings, tables and graphs to facilitate understanding of the topic. It can be presented on OHP or in Power Point. |      |           |
| Methods of carrying out auditory exercises | Group problem solving  
Discussion, brainstorming  
Other | Problems of each particular topic analysed are solved on the blackboard. After explaining and solving a problem of a topic, students are given a related one to solve it on their own but with assistance of the teacher. Using the BK technique and with assistance of their teacher, students create a smaller project. |      |           |
| Methods of carrying out seminars | Group problem solving  
Discussion, brainstorming |      |     |               |           |
| Course content lectures | 1. What is a project?, 2h, Learning outcomes:1,2,3,8  
2. Basic characteristics and project phases, 2h, Learning outcomes:1,2,3,4,7,8  
3. Unreliability of a project, 1h, Learning outcomes:1,2,5,7,8  
Project structure, 1h, Learning outcomes:1,3,5,6,7  
4. Preparing and making project plans , 2h, Learning outcomes:1,6,9,10  
5. Project costs and the flow of information, 2h, Learning outcomes:1,6,9,10  
6. Managing projects - Project Manager, 2h, Learning outcomes:1,2,6,7,8,9,10  
7. Organizational solutions, 1h, Learning outcomes:1,2,3,6,8  
Necessary knowledge - tools - PERT, CPM, PD, Microsoft Project, Transplan, 1h, Learning outcomes:1,4  
8. Necessary knowledge - tools - PERT, CPM, PD, Microsoft Project, Transplan, 2h, Learning outcomes:1,4  
9. Necessary knowledge - tools - PERT, CPM, PD, Microsoft Project, Transplan, 2h, Learning outcomes:1,4  
10. Necessary knowledge - tools - PERT, CPM, PD, Microsoft Project, Transplan, 2h, Learning outcomes:1,4  
11. Necessary knowledge - tools - PERT, CPM, PD, Microsoft Project, Transplan, 2h, Learning outcomes:1,4  
12. Necessary knowledge - tools - PERT, CPM, PD, Microsoft Project, Transplan, 2h, Learning outcomes:1,4  
13. Necessary knowledge - tools - PERT, CPM, PD, Microsoft Project, Transplan, 2h, Learning outcomes:1,4  
14. Optimisation of realised plans, 1h, Learning outcomes:1,5,7  
Procedures for making project plans, 1h, Learning outcomes:1,4,5,7,9,10  
15. Block chart techniques for making project plans, 2h, Learning outcomes:1,5,6,9,10 |      |           |
| Course content auditory | 1. Drawing the structure of a network arrow char, 1h, Learning outcomes:1,2,3,4  
2. Calculation back and forth (CPM i PERT), 1h, Learning outcomes:1,2,3,4  
3. Determination of the slack of the event and floats, 1h, Learning outcomes:1,2,3,4  
4. Drawing PD and calculation of a network, fixed terms and overlaps, 1h, Learning outcomes:1,2,3,4  
5. Drawing PD and calculation of a network, fixed terms and overlaps, 1h, Learning outcomes:1,2,3,4  
6. Drawing PD and calculation of a network, fixed terms and overlaps, 1h, Learning outcomes:1,2,3,4  
7. Drawing PD and calculation of a network, fixed terms and overlaps, 1h, Learning outcomes:1,2,3,4  
8. Drawing a network in a time diagram, 1h, Learning outcomes:1,2,3,4  
9. Drawing a network in a time diagram, 1h, Learning outcomes:1,2,3,4  
10. Making a network by BK technique, 1h, Learning outcomes:1,2,4  
11. Making a network by BK technique, 1h, Learning outcomes:1,2,3,4  
12. no classes, 1h  
13. no classes, 1h  
14. no classes, 1h  
15. no classes, 1h |      |           |
| Course content seminars | 1. no classes, 1h  
2. no classes, 1h  
3. no classes, 1h |      |     |           |           |
4. no classes, 1h
5. no classes, 1h
6. no classes, 1h
7. no classes, 1h
8. no classes, 1h
9. no classes, 1h
10. no classes, 1h
11. no classes, 1h
12. Preparation of a seminar paper and its presentation in front of a group of students., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10
13. Preparation of a seminar paper and its presentation in front of a group of students., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10
14. Preparation of a seminar paper and its presentation in front of a group of students., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10
15. Preparation of a seminar paper and its presentation in front of a group of students., 1h, Learning outcomes:1,2,3,4,5,6,7,8,9,10

| Required materials | Basic: classroom, blackboard, chalk...
|                   | Whiteboard with markers
|                   | Overhead projector
|                   | Video equipment

|                   | 5. Bilješke koje nastavnik priprema za nastavu

| Students obligations | maximum of 3 absences from exercises

| Knowledge evaluation during semester | Redovitost pohaa#8#15#50$Kolokvij, teorijska pitanja#2#50#50$Programski zadatak#1#35#100$

| Knowledge evaluation after semester | Written and oral exam.

| Remark | This course can not be used for final thesis theme

| Prerequisites: | No prerequisites.

| ISVU equivalents: | 22658;63916;63918;161640;

Students will acquire knowledge for the planning of civil engineering projects, preparation and monitoring of time
tables.

Lectures: mr.sc. Časlav Dunović, viši predavač

Auditory exercises: Nina Pančirović struc.spec.ing.aedif., asistent
Auditory exercises: Domagoj Šojat stručn.spec.ing.aedif.
Auditory exercises:v.predavač Boris Uremović dipl.ing.građ.

Course objectives
Students will acquire knowledge for the planning of civil engineering projects, preparation and monitoring of time
schedules for the realization of construction projects from the standpoint of project manager and planner.

Learning outcomes:
1. Define a time schedule for the project monitoring and control process. Level: 6, 7
2. Manage the project monitoring and control process using advanced software tools. Level: 6, 7
3. Classify risks that affect the project. Level: 6, 7
4. Critically evaluate the project that is being monitored so as to enable timely interventions in the project. Level: 7
5. Present current status of the project to all participants in the project. Level: 6, 7
6. Select an optimum solution for improving the situation on the project. Level: 6, 7
7. Recommend measures for improving the situation on the project. Level: 7

Methods of carrying out lectures
Ex cathedra teaching
Simulations
Discussion, brainstorming
Exercises
Other

Methods of carrying out auditory exercises
Laboratory exercises, computer simulations
Discussion, brainstorming
Computer simulations
Workshop
Other

Course content lectures
1. Participants in the project and time scheduling, 2h, Learning outcomes: 1, 2
2. Hierarchy of plans and project structure, 2h, Learning outcomes: 1
3. Role of project managers and planners, construction planning, 2h, Learning outcomes: 2
4. Non-linear and linear planning techniques, 2h, Learning outcomes: 1, 2
5. Planning principles and methodology, input data for the preparation of plans, plan preparation phases, distribution of
activities, 2h, Learning outcomes: 2, 3
6. Planning and cost optimization methods, application at the level of a project/company, 2h, Learning outcomes: 3, 4
7. Planning and cost optimization methods, application at the level of a project/company, 2h, Learning outcomes: 3, 4
8. Resource planning and optimizing methods, application at the level of a project/company, 2h, Learning outcomes: 3, 4
9. Project control and monitoring system, 2h, Learning outcomes: 3, 4, 5, 6, 7
10. Project monitoring, initial concept, collection of data and information systems, 2h, Learning outcomes: 3, 4, 5, 6, 7
11. Project monitoring, initial concept, collection of data and information systems, 2h, Learning outcomes: 3, 4, 5, 6, 7
12. Project monitoring methods and techniques, time scheduling, monitoring costs and quality, data integration, 2h,
Learning outcomes: 4, 5, 6, 7
13. Project monitoring methods and techniques, time scheduling, monitoring costs and quality, data integration, 2h,
Learning outcomes: 4, 5, 6, 7
14. Use of computer programs in project control and monitoring activities, 2h, Learning outcomes: 2
15. Practical examples of project control and monitoring systems on completed projects, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7

Course content auditory
1. Use of MS Project software in the production of plans through development of work structure, Gantt chart adjustment,
information about activities, use of limitations, priorities and calendar of activities, 2h, Learning outcomes: 1, 2
2. Time scheduling of resources and costs, use of resource calendar, presentation of work and material resources, 1h,
Learning outcomes: 1, 2
3. Advanced use of information adjustment capabilities, use of filters and optimizer, formatting and storing adjusted
information, 1h, Learning outcomes: 1, 2
4. Plan harmonization analysis and strategies, automatic and individual balancing of resources, use of priorities,
limitations, 2h, Learning outcomes: 1, 2, 3, 4
5. Plan preparation monitoring, Adjusting and monitoring time-related and financial parameters of a plan, 2h, Learning
outcomes: 1, 2, 3, 4
6. Production of reports and printing, 1h, Learning outcomes: 5
7. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
8. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
9. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
10. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
11. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
12. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
13. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
14. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7
15. Laboratory exercises, computer simulations, 2h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7

Required materials
Basic: classroom, blackboard, chalk...
General purpose computer laboratory
Whiteboard with markers
Overhead projector
Video equipment
Special equipment
Exercises are conducted in computer room where students are required to independently solve practical project planning and monitoring problems using the MS Project software package.

<table>
<thead>
<tr>
<th>Exam literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obvezna</td>
</tr>
<tr>
<td>Dopunska</td>
</tr>
<tr>
<td>2. S. Nonveiller: Metode mrežnog planiranja i njihova primjena u rukovodstvu građenjem, GF Zagreb, Zagreb 1982.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students obligations</th>
</tr>
</thead>
<tbody>
<tr>
<td>maximum of 3 absences from exercises</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation during semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redovitost poha#5#0#60$Kolokvij, numeri zadaci#1#50#60$Kolokvij, teorijska pitanja#1#50#60$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral part of the examination after successful presentation and justification of the assignment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course can be used for final thesis theme</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No prerequisites.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposal made by</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.Sc.M.C.E. Ćaslav Dunović, senior lecturer</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>21796/22579</td>
</tr>
</tbody>
</table>

**Name**
Public and Industrial Buildings

**Status**
2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**
Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home

**Teachers**
Lectures: 1. dr.sc. Dražen Arbutina dipl.ing.arh.
Auditory exercises: dr.sc. Dražen Arbutina dipl.ing.arh.
Construction exercises: dr.sc. Dražen Arbutina dipl.ing.arh.

**Course objectives**
Students will learn to independently manage building construction projects and to perform administrative tasks related to such projects.

**Learning outcomes:**
1. Improve functionality of public and industrial buildings: schools, kindergartens, and administrative, hotel, sports, commercial and industrial buildings. Level: 6, 7
2. Plan building position depending on construction conditions. Level: 6, 7
3. Select structural system in accordance with the buildings size and occupancy. Level: 7
4. Link together functional groups in a drawing. Level: 6, 7
5. Prepare conceptual design for public buildings/facilities. Level: 6, 7
6. Combine knowledge gained (structural system, finishing work, building physics, building elements) in the scope of the design work. Level: 6, 7
7. Write down technical information about the building. Level: 6, 7
8. Critically analyse form of the selected structural system. Level: 7
9. Explain notion behind conceptual design with an emphasis on the functionality and structure. Level: 7
10. Valorise project results based on the task assigned and knowledge acquired. Level: 7

**Methods of carrying out lectures**
Ex cathedra teaching
Guest lecturer
Case studies
Discussion
Questions and answers
Seminar, students presentation and discussion
Other
Appropriate teaching aids (projections) and blackboard presentations will be used in the course of the lectures.

**Methods of carrying out auditory exercises**
Traditional literature analysis
Data mining and knowledge discovery on the Web
Discussion, brainstorming
Interactive problem solving
Workshop
Other
Instructions for preparation of assignments.

**How construction exercises are held**
Group problem solving
Traditional literature analysis
Data mining and knowledge discovery on the Web
Discussion, brainstorming
Interactive problem solving
Workshop
Other
Independent preparation of assignments, with corrections.

**Course content - lectures**
1. Principal properties of public buildings, typology and principal design determinants for public buildings, 2h, Learning outcomes: 2, 3, 4, 6
   Technical and design documents, standards and regulations, 2h, Learning outcomes: 2, 4, 7
   2. Functional structure, technology design, physical analysis with examples, equipment and shaping, 4h, Learning outcomes: 1, 6, 7, 8
   3. Functional structure, technology design, physical analysis with examples, equipment and shaping, 2h, Learning outcomes: 2, 3, 4, 6, 7, 8
   Office buildings and educational buildings, 2h, Learning outcomes: 2, 3, 4, 7
   5. Office buildings and educational buildings, 4h, Learning outcomes: 2, 3, 4, 7, 9, 10
   6. Office buildings and educational buildings, 4h, Learning outcomes: 2, 3, 4, 7, 9, 10
   7. Health service buildings and social service buildings, 4h, Learning outcomes: 2, 3, 4, 7, 9, 10
   8. Health service buildings and social service buildings, 4h, Learning outcomes: 2, 3, 4, 7, 9, 10
   9. Tourism-related buildings, 4h, Learning outcomes: 2, 3, 4, 7, 9, 10
   10. Sports and recreation buildings, 4h, Learning outcomes: 2, 3, 4, 7, 9, 10
   11. Sports and recreation buildings, 2h, Learning outcomes: 2, 3, 4, 7, 9, 10
   12. Special public buildings (transport-related buildings), 4h, Learning outcomes: 2, 3, 4, 7, 9
   13. Types of industrial buildings, technology diagrams and designs, 4h, Learning outcomes: 1, 3, 4, 5, 6, 8, 9
   14. Types of industrial buildings, technology diagrams and designs, 4h, Learning outcomes: 1, 3, 4, 5, 6, 8, 9
   15. Ergonomic principles for the improvement of working environment: lighting, colour, temperature, 4h, Learning outcomes: 6, 7, 8, 10

**Course content - auditory**
1. Instructions for preparation of assignments, 4h, Learning outcomes: 2, 3, 4, 5, 6, 7, 8, 9, 10
2. Instructions for preparation of assignments, 4h, Learning outcomes: 2, 3, 4, 5, 6, 7, 8, 9, 10
3. Instructions for preparation of assignments, 2h, Learning outcomes: 2, 3, 4, 5, 6, 7, 8, 9, 10
<table>
<thead>
<tr>
<th>Course content constructs</th>
<th>1.</th>
<th>2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st assignment: Independent analysis of designed and completed public buildings (written and oral presentation), 4h, Learning outcomes:6,8,9,10</td>
<td>4th assignment: Independent analysis of designed and completed public buildings (written and oral presentation), 4h, Learning outcomes:6,8,9,10</td>
<td></td>
</tr>
<tr>
<td>1st assignment: Independent analysis of designed and completed public buildings (written and oral presentation), 4h, Learning outcomes:6,8,9,10</td>
<td>5th assignment: Independent analysis of designed and completed public buildings (written and oral presentation), 4h, Learning outcomes:6,8,9,10</td>
<td></td>
</tr>
<tr>
<td>1st assignment: Independent analysis of designed and completed public buildings (written and oral presentation), 4h, Learning outcomes:6,8,9,10</td>
<td>6th assignment: Independent analysis of designed and completed public buildings (written and oral presentation), 3h, Learning outcomes:6,8,9,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 1h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>7th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>8th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>9th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>10th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>11th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>12th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>13th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>14th assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
<tr>
<td>2nd assignment: independent preparation of the assignment, 4h, Learning outcomes:2,3,4,5,6,7,10</td>
<td>15th assignment: independent preparation of the assignment, 2h, Learning outcomes:2,3,4,5,6,7,10</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required materials</th>
<th>Basic: classroom, blackboard, chalk...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whiteboard with markers</td>
</tr>
<tr>
<td></td>
<td>Overhead projector</td>
</tr>
<tr>
<td></td>
<td>Portable overhead projector</td>
</tr>
<tr>
<td></td>
<td>Video equipment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.H. Auf Franić i sur.:Osnovne škole :Programiranje, planiranje i projektiranje, Arhitektonski fakultet sveučilišta u Zagrebu, 2005</td>
</tr>
<tr>
<td></td>
<td>3.Modeli fizičke kulture, RSIZ fizičke kulture Hrvatske, Zagreb 1977</td>
</tr>
<tr>
<td></td>
<td>5.D. Juračić: Zdravstvene zgrade, Arhitektonski fakultet Sveučilišta u Zagrebu,2005</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students obligations</th>
<th>maximum of 3 absences from exercises</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation during semester</th>
<th>Redovitost pohaa.#15.#0.#70.$Kolokvij, teorijska pitanja#.3.#30.$Seminarski rad#.1.#10.$100.$Programski zadatak#.1.#60.$100.$</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
<th>The examination consists of the written and oral parts:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Written part of the examination: textual and graphical verification of knowledge acquired during the course.</td>
</tr>
<tr>
<td></td>
<td>Oral part of the examination: verification of theoretical knowledge.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remark</th>
<th>This course can be used for final thesis theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisites</td>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
<td>Z1885/63920</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Name</td>
<td>Quality Management</td>
</tr>
<tr>
<td>Status</td>
<td>1st semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - obligatory course</td>
</tr>
<tr>
<td>Teaching mode</td>
<td>Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home</td>
</tr>
<tr>
<td>Course objectives</td>
<td>Students will gain essential knowledge in the field of quality management.</td>
</tr>
<tr>
<td>Learning outcomes:</td>
<td>1. select quality management tools to solve problems in a particular working environment. Level: 7</td>
</tr>
<tr>
<td></td>
<td>2. classify causes of problems by brainstorming and using the Ishikawa cause-and-effect diagram. Level: 6, 7</td>
</tr>
<tr>
<td></td>
<td>3. rank sources of errors using the Pareto diagram. Level: 7</td>
</tr>
<tr>
<td></td>
<td>4. recommend quality improvements according to quality management principles based on ISO or other excellence models. Level: 7</td>
</tr>
<tr>
<td></td>
<td>5. plan activities so as to avoid human errors, technical, random, and intentional errors due to poor communication. Level: 6, 7</td>
</tr>
<tr>
<td></td>
<td>6. propose corrective and preventive actions for processes in a particular working environment. Level: 6, 7</td>
</tr>
<tr>
<td></td>
<td>7. support quality requirements by means of technical legislation, Eurocode 1990, and regulations applicable to civil engineering. Level: 7</td>
</tr>
<tr>
<td>Methods of carrying out lectures</td>
<td>Ex cathedra teaching Guest lecturer Case studies Discussion Questions and answers Seminar, students presentation and discussion Drawings, tables and diagrams are used to facilitate understanding, as well as photographs and prepared materials used in companies.</td>
</tr>
<tr>
<td>Methods of carrying out auditory exercises</td>
<td>Group problem solving Traditional literature analysis Data mining and knowledge discovery on the Web Essay writing Discussion, brainstorming Workshop</td>
</tr>
<tr>
<td>Methods of carrying out seminars</td>
<td>Other</td>
</tr>
<tr>
<td>Course content lectures</td>
<td>1. Introduction. What is quality? What is quality management?, 4h, Learning outcomes: 1</td>
</tr>
<tr>
<td></td>
<td>2. Deming. Shewhart. Deming Prize. 5S. Ishikawa. Ishikawa diagram. Pareto diagram., 4h, Learning outcomes: 1, 2, 3</td>
</tr>
<tr>
<td></td>
<td>5. Taguchi. Robust design. Crosby., 4h, Learning outcomes: 3</td>
</tr>
<tr>
<td></td>
<td>7. Quality management in Civil Engineering., 4h, Learning outcomes: 7</td>
</tr>
<tr>
<td></td>
<td>8. Quality management in Civil Engineering., 2h, Learning outcomes: 7</td>
</tr>
<tr>
<td></td>
<td>9.</td>
</tr>
<tr>
<td></td>
<td>10.</td>
</tr>
<tr>
<td></td>
<td>11.</td>
</tr>
<tr>
<td></td>
<td>12.</td>
</tr>
<tr>
<td></td>
<td>13.</td>
</tr>
<tr>
<td></td>
<td>14.</td>
</tr>
<tr>
<td></td>
<td>15.</td>
</tr>
<tr>
<td>Course content seminars</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td>4. Presentation of students, 3h, Learning outcomes: 1, 2, 3, 4, 5, 6, 7</td>
</tr>
<tr>
<td></td>
<td>5.</td>
</tr>
<tr>
<td></td>
<td>6.</td>
</tr>
<tr>
<td></td>
<td>7.</td>
</tr>
<tr>
<td></td>
<td>8.</td>
</tr>
<tr>
<td></td>
<td>9.</td>
</tr>
<tr>
<td></td>
<td>10.</td>
</tr>
<tr>
<td></td>
<td>11.</td>
</tr>
<tr>
<td></td>
<td>12.</td>
</tr>
<tr>
<td></td>
<td>13.</td>
</tr>
<tr>
<td></td>
<td>14.</td>
</tr>
<tr>
<td></td>
<td>15.</td>
</tr>
<tr>
<td>Required materials</td>
<td>Basic: classroom, blackboard, chalk... Overhead projector</td>
</tr>
</tbody>
</table>
### Preporučena dopunska literatura:

- Androić, Boris; Dujmović, Darko; Džeba, Ivica. 2003. Inženjerstvo pouzdanosti 1, I.A. Projektiranje

### Students obligations:

#### Knowledge evaluation during semester

- 10 minitests and eseys (4 points each, possible 40 points in total),
- 2 tests (30 points each, 60 points in total).

Students who accumulate at least 24 points in minitests and eseys and at least 18 points on each tests do not need to take other type of exam.

#### Knowledge evaluation after semester

- Written exam: 60 points of possible 100 points.

### Remark

This course can be used for final thesis theme

### Prerequisites:

No prerequisites.

### ISVU equivalents:

22659;63919;63921;161641;

### Proposal made by

dr.sc. Sonja Zlatović, prof.v.šk., 11.02.2014.
<table>
<thead>
<tr>
<th>CodeWEB/ISVU</th>
<th>Code</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21793/22575</td>
<td></td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

### Name
Solid Waste Disposals

### Status
2nd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

### Teaching mode
Lectures + exercises (auditory + laboratory + seminar + methodology + construction) - work at home

### Teachers
- Lectures: Zlatko Milanović
- Auditory exercises: Zlatko Milanović
- Construction exercises: Zlatko Milanović

### Course objectives
Students will learn to recognise solid waste disposal problems and to independently solve basic problems related to solid waste disposal sites.

### Learning outcomes:
1. Critically evaluate the problem of waste disposal. Level: 7
2. Present a modern waste management system. Level: 6, 7
3. Develop an integrated solid waste disposal solution. Level: 6, 7
4. Analyse quality of waste disposal solutions, including organisation and work at the disposal site (list advantages and drawbacks). Level: 7
5. Manage work at the disposal site. Level: 6, 7

### Methods of carrying out lectures
By application of technical equipment, focus is put on practical examples, documented by photographs, video recordings and graphical explanations. For some units, offprints are prepared, which include basic overviews of lecture contents, pictures, sketches and the most important elements of presentations, with the aim to enable student participation in the knowledge transfer (asking questions, encouragement to independently form conclusions, discussion). A planned organized visit to a modern solid waste disposal.

### Methods of carrying out auditory exercises
Solving tasks and key problems in relation to lectures, with active student participation.

### How construction exercises are held
Preparation of programs based on topics dealt with in auditory exercises, under lecturer

#### Course content

**Lectures**

1. **Uvod - odstranjivanje, zbrinjavanje i odlaganje otpada.** 2h, Learning outcomes: 1
2. **Zbrinjavanje - odlaganje.** 2h, Learning outcomes: 2
3. **Cjelovit odriv sustav gospodarenja otpadom (CSGO).** 2h, Learning outcomes: 2
4. **Smanjivanje i izbjegavanje (spreanje) otpada.** 2h, Learning outcomes: 2
5. **CSGO i odlaganje krutog otpada.** 2h, Learning outcomes: 1, 2
6. **Utjecaj odlagališta otpada na okoli i okolicu.** 2h, Learning outcomes: 1, 3
7. **Oslove projekta odlagališta otpada.** 2h, Learning outcomes: 3
8. **I. kolokvij.** 1h, Learning outcomes: 3
9. **CSGO i odlagalište obraz otpada.** 1h, Learning outcomes: 3
10. **Izbor lokacije odlagališta otpada.** 2h, Learning outcomes: 3
11. **Sadržaj odlagališta otpada.** 2h, Learning outcomes: 3

**Auditory exercises**

1. **Razlike u lokacijama odlagališta otpada u kontinentalnom i primorskom području.** 2h, Learning outcomes: 1, 2, 3
2. **Plan gospodarenja otpadom velja površina odlagališta.** 2h, Learning outcomes: 3
3. **Izrada programa istražnog radova.** 2h, Learning outcomes: 3
4. **Izrada programa istražnog radova.** 2h, Learning outcomes: 3
5. **Prora volumena i geometrije odlagališta.** 2h, Learning outcomes: 3
6. **Prora volumena i geometrije odlagališta.** 2h, Learning outcomes: 3
7. **Nema vježbi.**
8. **Nema vježbi.**
9. **Nema vježbi.**
10. **Nema vježbi.**
11. **Nema vježbi.**
12. **Nema vježbi.**
13. **Nema vježbi.**
14. **Nema vježbi.**
15. **Nema vježbi.**

**Constructures**

1. **Nema vježbi.**
2. **Nema vježbi.**
3. **Nema vježbi.**
4. **Nema vježbi.**
5. **Nema vježbi.**
6. **Nema vježbi.**
7. **Terenske vježbe - odlagališta otpada.** 2h, Learning outcomes: 3, 4, 5
8. **Terenske vježbe - odlagališta otpada.** 2h, Learning outcomes: 3, 4, 5
9. **Terenske vježbe - odlagališta otpada.** 2h, Learning outcomes: 3, 4, 5
10. **Stabilnost odlagališta otpada - seminarски rad., 2h, Learning outcomes: 4
11. **Gornji i donji brtveni sloj - seminski rad., 2h, Learning outcomes: 3, 4
12. **Gornji i donji brtveni sloj - seminski rad., 2h, Learning outcomes: 3, 4
13. **Prora voda i odlagališnog plana - seminarски rad., 2h, Learning outcomes: 3, 4
14. **Prora voda i odlagališnog plana - seminarски rad., 2h, Learning outcomes: 3, 4

---

*stranica 66 / 87*
15. Kriti osvrt na organizaciju rada odlagalit otpada., 2h, Learning outcomes:5

<table>
<thead>
<tr>
<th>Required materials</th>
<th>Basic: classroom, blackboard, chalk...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whiteboard with markers</td>
</tr>
<tr>
<td></td>
<td>Overhead projector</td>
</tr>
<tr>
<td></td>
<td>Video equipment</td>
</tr>
</tbody>
</table>

| Exam literature   | 1. Separati koje priprema nastavnik    |
|                   | 2. Linkovi na materijale na web adresi|
|                   | Z. Milanović: Deponije za trajno odlaganje komunalnog otpada (1992) |
|                   | 3. Građevinski godišnjaci (odabrana godišta) |

| Students obligations | Izrasemnarski rad, uredno pohae nastave. |
|                      | Uspjeno poloen Kolokvij s numerim i teoretskim odrednicama. |

| Knowledge evaluation during semester | Aktivan i konstruktivan rad na vjebama. |
|                                      | Uspjeno izra i objanjeni seminarski radovi i poloen Kolokvij. |
|                                      | Prema sakupljenom broju bodova dobivaju se sljedeocjene: |
|                                      | 61-80 bodova - dovoljan (2) |
|                                      | 81-100 bodova - dobar (3) |
|                                      | 101-110 bodova - vrlo dobar (4) |
|                                      | vi od 111 bodova - izvrstan (5). |

| Knowledge evaluation after semester  | Ispit se polae u dva dijela: pismeni i usmeni dio. |

<p>| Remark | This course can not be used for final thesis theme |
| Prerequisites: | No prerequisites. |
| Proposal made by | v.predavač Zlatko Milanović 31.3.2014. |</p>
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21896/66754</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name**

Steel Engineering Structures

**Status**

3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**

Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

<table>
<thead>
<tr>
<th>Credit</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>30+10</td>
<td>140</td>
</tr>
</tbody>
</table>

**Teachers**

Lectures: 1. Dr.sc. Krunoslav Pavković dipl.ing.grad.
Lectures: 2. prof.vis.šk. Boris Baljkas
Auditory exercises: Dr.sc. Krunoslav Pavković dipl.ing.grad.

**Course objectives**

Students will acquire knowledge needed for the design, analysis and realization of steel structures.

**Learning outcomes:**

1. develop a cost-effective solution for a load bearing steel system. Level: 6, 7
2. anticipate failure modes for complex steel structures. Level: 6, 7
3. generate numerical models for static steel systems. Level: 6, 7
4. critically analyze results obtained by numerical analysis of complex systems. Level: 7
5. recommend engineering solutions for increasing the level of safety in structures. Level: 7

**Methods of carrying out lectures**

Ex cathedra teaching
Case studies
Modelling
Discussion
Seminar, students presentation and discussion
Other

**Methods of carrying out auditory exercises**

Group problem solving
Discussion, brainstorming
Computer simulations
Other

**Course content lectures**

1. Architecture and steel, 4h, Learning outcomes: 4, 5
2. Design procedures, 4h, Learning outcomes: 4, 5
3. Reliability, Multiple compression members, 2h, Learning outcomes: 4, 5
4. Thin-walled sections and problems with stability of thin-walled elements, 2h, Learning outcomes: 4, 5
5. Steel-concrete composite structures, 2h, Learning outcomes: 4, 5
6. Structural properties of elements and connections, 2h, Learning outcomes: 4, 5
7. Plasticity methods, 2h, Learning outcomes: 4, 5
8. Load modelling, 4h, Learning outcomes: 5
9. Frame systems and multistorey steel skeletons, 2h, Learning outcomes: 4, 5
10. Space trusses, 2h, Learning outcomes: 4, 5
11. Structures realized with steel cables, 4h, Learning outcomes: 4, 5
12.-
13.-
14.-
15.-

**Course content auditory**

1. Structural system selection, 2h, Learning outcomes: 4, 5
2. Selection of design model and use of computer software in the analysis, 2h, Learning outcomes: 4, 5
3. Steps in the analysis of structural elements, 2h, Learning outcomes: 4, 5
4. Presentation of working drawings with details, 2h, Learning outcomes: 4, 5
5.-
6.-
7.-
8.-
9.-
10.-
11.-
12.-
13.-
14.-
15.-

**Required materials**

Basic: classroom, blackboard, chalk...
General purpose computer laboratory
Whiteboard with markers
Overhead projector
Portable overhead projector
Video equipment
Special equipment
Program package for finite element analysis

**Exam literature**

Basic literature:

Additional literature:
2. Stahl im Hochbau, priručnik
3. Eurocode 0, 1, 2, 3, 4, 5, 8
<table>
<thead>
<tr>
<th><strong>Students obligations</strong></th>
<th>maximum of 3 absences from exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge evaluation during semester</strong></td>
<td>Projekt zadane konstrukcije</td>
</tr>
<tr>
<td><strong>Knowledge evaluation after semester</strong></td>
<td>written exam oral exam</td>
</tr>
<tr>
<td><strong>Remark</strong></td>
<td>This course can be used for final thesis theme</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>No prerequisites.</td>
</tr>
<tr>
<td><strong>Proposal made by</strong></td>
<td>Prof. Boris Baljkas, dipl.ing., 28.4.2014</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
<td>ECTS</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
</tr>
<tr>
<td>21798/22582</td>
<td>6.0</td>
</tr>
</tbody>
</table>

**Name**: Structural Modelling and Design

**Status**: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

**Teachers**

- Lectures: 1. prof. vis. šk. Boris Baljakas
- Lectures: 2. Dr. sc. Krunoslav Pavković dipl. ing. grad.
- Lectures: 3. doc. dr. sc. Dean Čizmar dipl. ing. grad.
- Auditory exercises: doc. dr. sc. Dean Čizmar dipl. ing. grad.
- Auditory exercises: Dr. sc. Krunoslav Pavković dipl. ing. grad.

**Course objectives**: Students will be educated to independently prepare building finite element model

**Learning outcomes**:

1. Classify complex structures with regard to linear, planar and volumetric elements. Level: 6, 7
2. Select the complex structure calculation model based on the finite element method. Level: 7
3. Analyze mechanical condition of the structure with regard to predefined external actions. Level: 6, 7
4. Analyze acceptability of the approximation obtained for critical areas of the structure. Level: 7
5. Propose improvement of the numerical model for the analysis of the required mechanical condition. Level: 6, 7
6. Estimate suitability of structural analysis contained in technical documentation for construction work. Level: 6, 7

**Methods of carrying out lectures**

- Ex cathedra teaching
- Case studies
- Simulations
- Modelling
- Discussion
- Questions and answers

**Methods of carrying out auditory exercises**

- Group problem solving
- Computer simulations
- Workshop
- Other

**Course content lectures**

1. Basic concept, assumptions, design system; equilibrium equations., 2h, Learning outcomes: 1, 2
2. Member stiffness matrix, vectors of load and other actions, transformation matrix, structural stiffness matrix., 2h, Learning outcomes: 1, 2
3. Bearings. Geometrical and natural boundary conditions., 2h, Learning outcomes: 1, 2
4. Elastic theory - basic notions, 2h, Learning outcomes: 1, 2
5. Elastic theory - basic notions, 2h, Learning outcomes: 1, 2
8. Finite element method, 2h, Learning outcomes: 2, 4, 5
9. Finite element method, 2h, Learning outcomes: 2, 4, 5
10. Finite element method, 2h, Learning outcomes: 2, 4, 5
11. Finite element method, 2h, Learning outcomes: 2, 4, 5
12. Finite element method, 2h, Learning outcomes: 2, 4, 5
13. Use of commercial software; input data; interpretation of results., 2h, Learning outcomes: 1, 2, 3, 4, 5
14. Use of commercial software; input data; interpretation of results., 2h, Learning outcomes: 1, 2, 3, 4, 5
15. Use of commercial software; input data; interpretation of results., 2h, Learning outcomes: 1, 2, 3, 4, 5

**Course content auditory**

1. Introduction to the software package for numerical modeling, 2h, Learning outcomes: 2, 3
2. Introduction to the software package for numerical modeling, 2h, Learning outcomes: 2, 3
3. Introduction to the software package for numerical modeling, 2h, Learning outcomes: 2, 3

**Required materials**

- Basic: classroom, blackboard, chalk...
- General purpose computer laboratory
- Overhead projector

**Exam literature**

1. J. Sorić: Metoda konačnih elemenata; Golden marketing-Tehnička knjiga, Zagreb, 2004. (udžbenik)
2. D. Lazarević i J. Dvornik; Plošni nosači, Bilješke s predavanja, GF, 2013.

**Additional literature**

### Students obligations

<table>
<thead>
<tr>
<th>Knowledge evaluation during semester</th>
<th>maximum of 3 absences from exercises and lectures</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
<th>Redovitost pohaa</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Written examination</th>
<th>Oral examination</th>
</tr>
</thead>
</table>

### Remark

This course can be used for final thesis theme

### Prerequisites:

No prerequisites.

### Proposal made by

Prof. Boris Baljkas dipl.ing., 23.04.2014

---

<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>21784/22564</th>
<th>ECTS</th>
<th>5.0</th>
<th>Academic year</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Train Stations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching mode</td>
<td>Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home</td>
<td>15+3 (3+0+0+0)</td>
<td>132</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td>Lectures: mr.sc. Ante Goran Bajić viši predavač Auditory exercises: mr.sc. Ante Goran Bajić viši predavač</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course objectives</td>
<td>Students will gain an in-depth theoretical, practical and operative knowledge about the design, construction and maintenance of train stations and railway yards, and will make study visits to large train stations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning outcomes:</td>
<td>1. evaluate basic problems in the organisation of railway transport and use of train stations. Level:7 2. critically evaluate similarities and differences between throughway stations and terminus stations, and the influence of their plans on train passing capacity. Level:7 3. create basic elements of a railway station, present practical knowledge on the construction and maintenance of railway stations. Level:6,7 4. select special in-track devices (turnouts) types, differences, and use-related problems. Level:7 5. arrange all horizontal elements of a track turnout in train station and prepare a 1:500 final stakeout plan. Level:6,7 6. define factor of safety for vehicles passing through turnouts of a given radius and separation angle. Level:7 7. propose all track separation elements and draw a stakeout plan. Level:6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out lectures</td>
<td>Case studies Discussion Questions and answers Other Appropriate teaching aids (slides, overhead projector, and video films) will be used during lectures. Comprehension of course material will additionally be enhanced by visit of significant train stations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out auditory exercises</td>
<td>Group problem solving Other Instructions, numerical examples and regulations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course content auditory</td>
<td>1. Instructions, numerical examples and regulations for solving problems during structural exercises, 3h, Learning outcomes:4,5,6,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required materials</td>
<td>Basic: classroom, blackboard, chalk... Whiteboard with markers Overhead projector Portable overhead projector Video equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students obligations</td>
<td>maximum of 3 absences from exercises</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge evaluation during semester</td>
<td>Redovitost pohaa#20#0#80$Programski zadatak#1#0#100$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge evaluation after semester</td>
<td>Written part of the examination (concerning topics presented during lectures). Oral part of the examination for students who obtained at least 60 points during the written examination.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remark</td>
<td>This course can be used for final thesis theme</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>No prerequisites.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tunnels

3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalista graditeljstva) - elective course

Lectures + exercises (auditory + laboratory + seminar + metodology + construction) work at home

30+8 (8+0+0+0)

112

Its not valid

1. mr.sc. Željko Lebo v. pred.
2. doc.dr.sc. Miroslav Šimun dipl.ing.građ.
3. mr.sc. Željko Lebo v. pred.
4. Ivan Mustapić
5. doc.dr.sc. Miroslav Šimun dipl.ing.građ.

Students will gain fundamental knowledge about preliminary investigations, design and construction of underground facilities and tunnels.

1. classify rock mass in which tunnel construction is planned. Level:6,7
2. design tunnel cross section depending on the planned use of the tunnel. Level:6,7
3. explain selection of the tunnel support technology. Level:7
4. estimate tunnel route accuracy in plan, longitudinal profile, and cross-section. Level:7
5. manage tunnel construction works. Level:6,7
6. analyse tunnel design alternatives. Level:7

Ex cathedra teaching
Modelling
Discussion
Questions and answers
Other
Various underground structures and facilities in different stages of realization (preliminary investigations, design and construction) are presented to students using simple models, drawings, and photographs. Students are encouraged to actively participate in the lectures.

Appropriate problems are solved in the course of these exercises. Students are expected and encouraged to actively participate in the exercises.

1. Introduction of the tunnel issue, 2h, Learning outcomes:5
2. POSITION AND TRAFFIC FUNCTION OF TUNNEL, 2h, Learning outcomes:4
3. Methods of tunneling, 2h, Learning outcomes:3
4. General information about underground construction from geotechnical aspects of view, 2h, Learning outcomes:1
5. Geotechnical research, 2h, Learning outcomes:1
6. Primary and secondary stress and rock mass classification, 2h, Learning outcomes:1
7. New Austrian Tunneling Method, rock as an engineering material, 2h, Learning outcomes:1
8. Classical and modern methods of construction, 2h, Learning outcomes:3
9. Safety, accident and lessons, 2h, Learning outcomes:4,5
10. Tunnel classes, 2h, Learning outcomes:4,5,6
11. TBM method, 2h, Learning outcomes:3
12. ADECCO method, 2h, Learning outcomes:3,6
13. ADECCO method, 2h, Learning outcomes:3,6
14. Portal buildings, 2h, Learning outcomes:2
15. Horizontal components and accessories, 2h, Learning outcomes:5

Basic: classroom, blackboard, chalk...
General purpose computer laboratory
Whiteboard with markers
Overhead projector
Video equipment

1. Ž. Lebo: Separati predavanja na webu
2. V. Požgajčić: Separati predavanja na webu
3. P. Lunardi: The Analysis of Controlled Deformation in Rocks and Soils (ADECO-RS)

Basic literature:

Exam literature:

Required materials:

Exam literature:
<table>
<thead>
<tr>
<th><strong>Students obligations</strong></th>
<th>Orderly class attendance, drafting and surrender of the program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge evaluation during semester</strong></td>
<td>no the colloquium</td>
</tr>
<tr>
<td><strong>Knowledge evaluation after semester</strong></td>
<td>Written and verbal exam</td>
</tr>
<tr>
<td><strong>Remark</strong></td>
<td>This course can be used for final thesis theme</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>No prerequisites.</td>
</tr>
<tr>
<td><strong>Proposal made by</strong></td>
<td>mr.sc. Željko Lebo, lecturer, 30.6.2015, Vladimir Požgajčić, pred</td>
</tr>
</tbody>
</table>
Zagreb University of Applied Sciences

Study programme for academic year 2017/2018

Code WEB/ISVU: 21787/22567
ECTS: 6.0
Academic year: 2017/2018

Name: Urban Transport Facilities
Status: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

Teaching mode: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

Teachers:
- Lectures: doc.dr.sc. Miroslav Šimun dipl.ing.grad.
- Auditory exercises: Sandra Mihalinac mag.ing.aedif.

Course objectives: Students will learn to deal with complex problems encountered in the planning, design and construction of urban transport facilities.

Learning outcomes:
1. formulate/define requirements for the planning and design of urban roads and intersections. Level:6,7
2. compare traffic, structural, urban planning, and environmental parameters for selecting an optimum form of an urban intersection. Level:6,7
3. select transport and technical cross-sectional elements of urban roads. Level:7
4. design an at-grade intersection (traditional and circular intersections). Level:6,7
5. evaluate individual alternative solutions for selecting an optimum intersection form. Level:7
6. reexamine existing road and intersection solutions in urban areas. Level:6,7
7. define urban road maintenance elements. Level:7

Methods of carrying out lectures:
- Ex cathedra teaching
- Case studies
- Discussion
- Questions and answers
- Other

Appropriate teaching aids (overhead projector, video projector) will be used to illustrate theoretical presentation of course material.

Methods of carrying out auditory exercises:
- Computer simulations
- Other

The material exposed during these exercises is illustrated by practical solutions and concepts presented by means of video projector.

Course content lectures:
1. Urban transport facilities and urban transport subsystems, 2h, Learning outcomes:1,3
2. Categorization and classification, spatial models, 2h, Learning outcomes:1,3
3. Starting points and conditions for the design of transport facilities, 2h, Learning outcomes:1,3,7
4. Design elements for roads and streets, 2h, Learning outcomes:1,3,6
5. Grade separated intersections, 2h, Learning outcomes:2,5
6. At-grade intersections - I part, 2h, Learning outcomes:2,5
7. At-grade intersections - II part, 2h, Learning outcomes:2,5
8. Roundabouts, 2h, Learning outcomes:2,4,7
9. Parking lots and garages, 2h, Learning outcomes:2,4,7
10. Secondary and special transport facilities, 2h, Learning outcomes:1,7
11. Public city transport of passengers, 2h, Learning outcomes:1,3,7
12. Pathways for bicycles and pedestrians, 2h, Learning outcomes:1,3,7
13. Communal equipment and drainage of roads, 2h, Learning outcomes:1,3,6
14. Traffic and other equipment, traffic signs and markings, 2h, Learning outcomes:1,3,6
15. Introduction to maintenance of urban transport facilities, studies and design documents, 2h, Learning outcomes:6,7

Course content auditory:
1. Introduction, tasks division and interpretation of divisional island shapin, 2h, Learning outcomes:1,2,3,4
2. Interpretation of divisional island shapin, 2h, Learning outcomes:1,2,3,4
3. Interpretation of divisional island shapin, 2h, Learning outcomes:1,2,3,4
4. Making divisional island shapin, 2h, Learning outcomes:1,2,3,4
5. Making divisional island shapin, 2h, Learning outcomes:1,2,3,4
6. Defining capacity for intersections not equipped with traffic lights, 1h, Learning outcomes:4,5,6
7. Checking capacity for intersections not equipped with traffic lights, 1h, Learning outcomes:4,5,6
8. Interpretation of triangular islands, 2h, Learning outcomes:2,3,4
9. Interpretation of the turning lane in left, 1h, Learning outcomes:2,3,4
10. Making the turning lane in left, 1h, Learning outcomes:2,3,4
11. Making the additional right lane, 1h, Learning outcomes:2,3,4
12. Making the additional right lane, 1h, Learning outcomes:2,3,4
13. Making the additional right lane, 1h, Learning outcomes:2,3,4
14. Making the edge pavement for side driveway, 2h, Learning outcomes:2,3,4
15. Making the edge pavement for side driveway, 2h, Learning outcomes:2,3,4
16. Making the bus station and pedestrian crossing, 1h, Learning outcomes:2,3,4
17. Making the bus station and pedestrian crossing, 1h, Learning outcomes:2,3,4
18. Making all elements in program, 2h, Learning outcomes:1,2,3,4
19. Making technical description and delivery program, 1h, Learning outcomes:1,4,6
20. Making description and delivery program, 1h, Learning outcomes:1,4,6
21. Making all elements in program, 2h, Learning outcomes:1,2,3,4
22. Making technical description and delivery program, 1h, Learning outcomes:1,4,6
23. Making description and delivery program, 1h, Learning outcomes:1,4,6
24. Making all elements in program, 2h, Learning outcomes:1,2,3,4
25. Control and delivery of programs, 2h, Learning outcomes:1,4

Students obligations: maximum of 3 absences from exercises

Student activities:
Name: Variety and Protection of Living World

Status: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

Teaching mode: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

ECTS: 3.0

Academic year: 2017/2018

Course objectives:
Students will be sensitized to the need of preserving biological diversity and safeguarding animate word so as to enable sustainable utilisation of water.

Learning outcomes:
1. Correlate basic environmental principles, and circulation of matter and energy, with sustainable use of water. Level: 6, 7
2. Recommend environmental engineering measures to be introduced in water management plans. Level: 7
3. Anticipate effects of human activities on the condition of water and water ecosystems. Level: 6, 7
4. Critically analyse decisions on the use of water and water ecosystems, including the use of water as the place for final discharge of waste waters. Level: 7
5. Plan interventions in natural environment in accordance with principles of sustainable development. Level: 6, 7

Methods of carrying out lectures:
Ex cathedra teaching
Guest lecturer
Case studies
Demonstration
Discussion
Questions and answers
Seminar, students presentation and discussion
Auditory

Course content lectures:
1. The plan of course content and exam, 2h
2. Concept, content and importance of ecology, 1h, Learning outcomes: 1
3. Connection of the hydrology and ecology, 1h, Learning outcomes: 1
4. Circulation of matter and energy flow, 1h, Learning outcomes: 1
5. Biogeochemical processes and organic production, 1h, Learning outcomes: 1
6. Condition of water and importance of water conservation, 1h, Learning outcomes: 1, 2
7. The terms that describe the state of water, 1h, Learning outcomes: 1, 2
8. Evaluation of the state of water by biological and chemical indicators, 2h, Learning outcomes: 2
9. The impact of pollution on water status, 1h, Learning outcomes: 3
10. Water ecosystems, 1h, Learning outcomes: 3
11. Methods and indices describing the ecological status of water, 1h, Learning outcomes: 4
12. River basin management and definition of water bodies, 1h, Learning outcomes: 4, 5
13. Areas of practical application of ecology, 2h, Learning outcomes: 4, 5
14. Protected areas and NATURA 2000 sites as special protection waters, 2h, Learning outcomes: 4, 5
15. Using natural retention of water management, 2h, Learning outcomes: 4, 5
16. Sustainable use of water, 2h, Learning outcomes: 4, 5
17. Natural processes of wastewater treatment, 2h, Learning outcomes: 4, 5
18. Environmental engineering - control eutrophication, 2h, Learning outcomes: 5
19. Colloquium, 1h, Learning outcomes: 1, 2, 3, 4, 5
20. The first project - submission and explanation, 1h, Learning outcomes: 1, 2, 3, 4, 5
21. Repeated colloquium, 1h, Learning outcomes: 1, 2, 3, 4, 5
22. Oral part of the exam, 1h, Learning outcomes: 1, 2, 3, 4, 5
23. Knowledge evaluation during the theoretical part of the learning outcomes, max 70 points
24. Passage: more than 36 points. (50%)

Required materials:
Special purpose laboratory
General purpose computer laboratory
Whiteboard with markers
Overhead projector
Video equipment

Exam literature:
1. Ćosić-Flajsig G.: Interna skripta kolegija Raznolikost i očuvanje živog svijeta, TVZ. Graditeljski odjel
4. Primc Habdija B., Kerovc M. i sur.: Biološka valorizacija voda - Metode i indikaorski sustav HR, HRIS Biološki odsjek PMF-a, Zagreb 2003

Students obligations:
Regularity of attendance, max 30 points
Lectures start: 30 points, 1 point for a delay or absence
Condition: 20 points
Developed and defended the project.
Evaluates the preparation, dedication, contents and layout of the project.

Knowledge evaluation during:
The theoretical part of the learning outcomes, max 70 points
Passage: more than 36 points. (50%)
<table>
<thead>
<tr>
<th>semester</th>
<th>Colloquium has correction.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oral examination: max 30 points.</td>
</tr>
<tr>
<td></td>
<td>In total, the maximum 100 points.</td>
</tr>
<tr>
<td></td>
<td>91-100 = 5</td>
</tr>
<tr>
<td></td>
<td>81-90 = 4</td>
</tr>
<tr>
<td></td>
<td>71-80 = 3</td>
</tr>
<tr>
<td></td>
<td>61 - 70 = 2</td>
</tr>
<tr>
<td></td>
<td>60 and under, under-achievement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
<th>Written exam, max. 70 points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The oral part of the exam, max. 30 points</td>
</tr>
<tr>
<td></td>
<td>Passage: more than 42 points (60%)</td>
</tr>
<tr>
<td></td>
<td>In total, the maximum 100 points.</td>
</tr>
<tr>
<td></td>
<td>91-100 = 5</td>
</tr>
<tr>
<td></td>
<td>81-90 = 4</td>
</tr>
<tr>
<td></td>
<td>71-80 = 3</td>
</tr>
<tr>
<td></td>
<td>61 - 70 = 2</td>
</tr>
<tr>
<td></td>
<td>60 and under, under-achievement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remark</th>
<th>This course can be used for final thesis theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisites:</td>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Proposal made by</td>
<td>Gorana Cosic-Flajsig, M.sc., Senior Lecturer, 31.01.2014.</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
<td>ECTS</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
</tr>
<tr>
<td>21790/22572</td>
<td>6.0</td>
</tr>
</tbody>
</table>

**Name**: Wastewater Treatment  
**Status**: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course  
**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + methodology + construction). Work at home.  
**ECTS**: 6.0  
**Academic year**: 2017/2018  
**Teachers**:  
- Lectures: mr.sc. Gorana Ćosić-Flajsig viši predavač  
- Auditory exercises: mr.sc. Gorana Ćosić-Flajsig viši predavač  
- Laboratory exercises: Marin Ganjto  
- Laboratory exercises: mr.sc. Gorana Ćosić-Flajsig viši predavač  
**Course objectives**: Students will be able to recognise importance of the wastewater discharge limitations and control, and will also be able to understand and independently solve problems related to water treatment and drainage facilities.  
**Learning outcomes**:  
1. critically analyse input data and support documents for the selection of waste water treatment procedures. Level:7  
2. correlate sewage system and wastewater treatment activities. Level:6,7  
3. critically analyse environmental impact of sewage system ad waste water treatment facilities. Level:7  
4. select an alternative for dimensioning individual units of a municipal waste water treatment device. Level:7  
5. formulate/define the waste water treatment concept by means of the first, second and third level of purification. Level:6,7  
6. formulate/define the sludge treatment and disposal concept. Level:6,7  
**Methods of carrying out lectures**: Ex cathedra teaching, Guest lecturer, Case studies, Demonstration, Modelling, Discussion, Questions and answers, Seminar, students presentation and discussion, Integrating and expanding acquired knowledge in the fields of water use, water protection and water structures to gain a broader perspective of sewerage and wastewater treatment processes. Up to-date educational means are used in lectures, and explanations are supplemented by graphic presentations. Planned visit to several wastewater treatment facilities (Zagreb, kovec, Virovitica, etc.).  
**Methods of carrying out auditory exercises**: Laboratory exercises on laboratory equipment, Group problem solving, Traditional literature analysis, Data mining and knowledge discovery on the Web, Discussion, brainstorming, Mind mapping, Workshop, Solving examples of subject matter explained in lectures.  
**Methods of carrying out laboratory exercises**: Laboratory exercises on laboratory equipment, Group problem solving, Traditional literature analysis, Discussion, brainstorming, Computer simulations, Workshop, Visit to laboratory which performs water analyses and learning about water quality determination process.  
**Course content**:  
1. The plan of the course content and exams, 2h  
2. Water protection and basic elements of the sewerage system, 1h, Learning outcomes:1  
3. The concept of agglomeration and defining the level of wastewater treatment, 1h, Learning outcomes:1  
4. Legislation regarding the level of wastewater treatment, 1h, Learning outcomes:1  
5. View the status of development of the public sewerage system, 1h, Learning outcomes:2  
6. Water quality management, 1h, Learning outcomes:3  
7. Diffuse sources of pollution, 1h, Learning outcomes:3  
8. General Waste Water Treatment, 2h, Learning outcomes:3  
9. Basics of wastewater treatment, 2h, Learning outcomes:1,3  
10. The previous level of treatment, 1h, Learning outcomes:4,5  
11. The first stage of treatment, 1h, Learning outcomes:4,5  
12. The secondary treatment, 2h, Learning outcomes:4,5  
13. The secondary treatment, 2h, Learning outcomes:4,5  
14. The third treatment, 2h, Learning outcomes:4,5  
15. No lessons  
16. No lessons  
17. No lessons  
18. No lessons  
19. No lessons  
20. No lessons  
21. No lessons  
22. No lessons  
23. No lessons  
24. Natural processes of wastewater treatment, 1h, Learning outcomes:4,5,6  
25. Second Colloquium, 1h, Learning outcomes:4,5,6  
26. Corrective Colloquium, 1h, Learning outcomes:1,2,3,4,5,6  
27. The oral part of the exam, 1h, Learning outcomes:1,2,3,4,5,6  
28. No lessons  
29. No lessons  
30. No lessons
<table>
<thead>
<tr>
<th>Course content</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No lessons</td>
<td>1. No lessons</td>
</tr>
<tr>
<td>2. No lessons</td>
<td>2. No lessons</td>
</tr>
<tr>
<td>3. No lessons</td>
<td>3. No lessons</td>
</tr>
<tr>
<td>4. No lessons</td>
<td>4. No lessons</td>
</tr>
<tr>
<td>5. No lessons</td>
<td>5. No lessons</td>
</tr>
<tr>
<td>6. No lessons, Learning outcomes:5</td>
<td>6. Field tour of Zagreb wastewater treatment plant, 2h, Learning outcomes:3,4,5,6</td>
</tr>
<tr>
<td>7. No lessons</td>
<td>7. No lessons</td>
</tr>
<tr>
<td>8. Field tour of Zagreb wastewater treatment plant, 2h, Learning outcomes:3,4,5,6</td>
<td>8. Field tour of Karlovac wastewater treatment plant, 2h, Learning outcomes:3,4,5,6</td>
</tr>
<tr>
<td>9. Monitoring the characteristic parameters of Zagreb wastewater treatment plant, 2h, Learning outcomes:3,4,5,6</td>
<td>9. Monitoring the characteristic parameters of Karlovac wastewater treatment plant, 2h, Learning outcomes:3,4,5,6</td>
</tr>
<tr>
<td>10. No lessons</td>
<td>10. No lessons</td>
</tr>
<tr>
<td>11. No lessons</td>
<td>11. No lessons</td>
</tr>
<tr>
<td>12. No lessons</td>
<td>12. No lessons</td>
</tr>
<tr>
<td>13. No lessons</td>
<td>13. No lessons</td>
</tr>
<tr>
<td>15. No lessons</td>
<td>15. No lessons</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whiteboard with markers</td>
</tr>
<tr>
<td>Overhead projector</td>
</tr>
<tr>
<td>Video equipment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exam literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literatura:</td>
</tr>
<tr>
<td>1. Ćosić-Flajsig: Interna skripta kolegija Pročišćavanje voda, TVZ, Graditeljski odjel</td>
</tr>
<tr>
<td>2. Tedeschi S: Zaštita vodnih sustava ipročišćavanje otpadnih voda, HDGI, Zagreb, 2007</td>
</tr>
<tr>
<td>Preporučena literatura:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students obligations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regularity of attendance, max 60 points</td>
</tr>
<tr>
<td>Lectures start: 30 points, 1 point for a delay or absence</td>
</tr>
<tr>
<td>Condition: 20 points</td>
</tr>
<tr>
<td>The exercises start: 30 points, 1 point for a delay or absence</td>
</tr>
<tr>
<td>Condition: 20 points</td>
</tr>
<tr>
<td>Passed two mini-test</td>
</tr>
<tr>
<td>Made and explained the four projects.</td>
</tr>
<tr>
<td>Evaluates the preparation, dedication, contents and layout of the project.</td>
</tr>
<tr>
<td>Colloquium exercises: individual interpretation reports, the condition for a positive assessment exercises and signature.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation during semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>The theoretical part of the learning outcomes, max 70 points</td>
</tr>
<tr>
<td>Two of the colloquium by 35 points, the passage: more than 18 points</td>
</tr>
<tr>
<td>Positive colloquium has ratings of both exams by more than 18 points.</td>
</tr>
<tr>
<td>Each of the colloquium has correction.</td>
</tr>
<tr>
<td>Oral examination: max 30 points.</td>
</tr>
<tr>
<td>In total, the maximum 100 points.</td>
</tr>
<tr>
<td>91-100 = 5</td>
</tr>
<tr>
<td>81-90 = 4</td>
</tr>
<tr>
<td>71-80 = 3</td>
</tr>
<tr>
<td>61 - 70 = 2</td>
</tr>
<tr>
<td>60 and under, under-achievement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge evaluation after semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam, max. 70 points</td>
</tr>
<tr>
<td>The oral part of the exam, max. 30 points</td>
</tr>
<tr>
<td>total, the maximum 100 points.</td>
</tr>
<tr>
<td>91-100 = 5</td>
</tr>
<tr>
<td>81-90 = 4</td>
</tr>
<tr>
<td>71-80 = 3</td>
</tr>
</tbody>
</table>
61 - 70 = 2
60 and under, under-achievement.

<table>
<thead>
<tr>
<th>Remark</th>
<th>This course can be used for final thesis theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisites:</td>
<td>No prerequisites.</td>
</tr>
<tr>
<td>Proposal made by</td>
<td>Gorana Cosić-Flajsig, M.Sc., Senior Lecturer, 31.01.2014.</td>
</tr>
<tr>
<td>Code WEB/ISVU</td>
<td>ECTS</td>
</tr>
<tr>
<td>------------------</td>
<td>------</td>
</tr>
<tr>
<td>WEB/ISVU</td>
<td>6.0</td>
</tr>
</tbody>
</table>

**Name**

Water Resources Systems

**Status**

3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalista graditeljstva) - elective course

**Teaching mode**

Lectures + exercises (auditory + laboratory + seminar + methodology + construction)

**ECTS**

6.0

**Academic year**

2017/2018

**Name**

Water Resources Systems

**Status**

3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalista graditeljstva) - elective course

**Teaching mode**

Lectures + exercises (auditory + laboratory + seminar + methodology + construction)

**ECTS**

6.0

**Academic year**

2017/2018

**Name**

Water Resources Systems

**Status**

3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalista graditeljstva) - elective course

**Teaching mode**

Lectures + exercises (auditory + laboratory + seminar + methodology + construction)

**ECTS**

6.0

**Academic year**

2017/2018

**Course objectives**

Students will learn how to integrate knowledge and skills gained in the fields of water use, water protection and river engineering, and to use such knowledge for recognizing and solving problems relating to the planning and implementation of water systems.

**Learning outcomes:**

1. determine the basis for managing water systems (objectives, criteria, constraints). Level: 7
2. evaluate elements of for evaluating the water system. Level: 7
3. determine their ability level and implementation of simulation and optimization techniques in the management of water systems. Level: 6, 7
4. predložiti opseg informacijskog sustava. kod upravljanja vodnim sustavima. Level: 6, 7
5. evaluate the possible applications and elements of for the economic evaluation of alternative solutions. Level: 6, 7
6. evaluate the major impact of building and operation of the water system on the environment. Level: 6, 7
7. formulate phases and content study in planning water systems. Level: 6, 7

**Methods of carrying out lectures**

Ex cathedra teaching

Case studies

Discussion

Lectures are performed orally, with aid of modern IT equipment; graphic and photographic illustrative presentations of constituent components of water systems. In auditory exercises, a field excursion is planned to view water systems and/or its components.

**Methods of carrying out auditory exercises**

Group problem solving

Discussion, brainstorming

Computer simulations

Problem-solving on the blackboard, with active student participation.

**Course content lectures**

1. Introduction and basic terms., 2h, Learning outcomes: 1
2. The basic theory management systems., 2h, Learning outcomes: 2
3. Types of water systems, according ways of water use and use., 2h, Learning outcomes: 2
4. Techniques a systemic analysis and synthesis., 2h, Learning outcomes: 2
5. Simulation method of water systems., 2h, Learning outcomes: 3
6. Methods for optimizing the water management systems., 2h, Learning outcomes: 3
7. Methods for optimizing the water management systems., 2h, Learning outcomes: 3
8. I. preliminary exam., 2h, Learning outcomes: 1, 2, 3
9. Information systems within the framework water system., 2h, Learning outcomes: 4
10. Information systems within the framework water system., 1h, Learning outcomes: 4
11. The economic evaluation of of water systems., 1h, Learning outcomes: 5
12. Water systems and the an environment., 2h, Learning outcomes: 6
13. Water systems and the an environment., 1h, Learning outcomes: 6
14. Planning water system., 2h, Learning outcomes: 7
15. II. preliminary exam., 2h, Learning outcomes: 4, 5, 6, 7

**Course content auditory**

1. Input and methods of valorization of water systems., 2h, Learning outcomes: 1, 2
2. Solving the tasks of optimizing the management of water systems using linear programming., 2h, Learning outcomes: 2, 3
3. Solving the tasks of optimizing the management of water systems using linear programming., 2h, Learning outcomes: 2, 3
4. Solving the task of optimization the management water systems using dynamic programming., 2h, Learning outcomes: 2, 3
5. Solving the task of optimization the management water systems using dynamic programming., 2h, Learning outcomes: 2, 3
6. Solving the task of optimizing components water systems using the economic analysis., 2h, Learning outcomes: 3
7. Solving task of optimization components water systems using cost benefit method., 2h, Learning outcomes: 3
8. No lessons.
10. No lessons.
11. No lessons.
12. No lessons.
13. No lessons.
15. No lessons.

**Required materials**

Basic: classroom, blackboard, chalk...

General purpose computer laboratory

Whiteboard with markers

Overhead projector

Video equipment
### Exam literature

<table>
<thead>
<tr>
<th>Basic literature:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dodatna:</th>
</tr>
</thead>
</table>

### Students obligations

- Attending lectures and exercises (maximum 25% of absences).
- Make, present and explain the method of solving seminar. Achieve a minimum of 60% of the maximum possible points.
- On each of the two preliminary exams or one repeated, achieve a minimum of 33% of the maximum possible points.

### Knowledge evaluation during semester

The actual number of credits during the semester are: the program of work - a maximum of 20 credits and two exams - a maximum of 80 credits.

Necessary conditions for the passage are:
- Make, present and explain the way to solve the programming task. Achieve a minimum of 75% of the maximum credits possible.
- On each of the two preliminary exams or once repeated to achieve a minimum of at least 55% of the points.
- On the basis of points achieved the following success:
  - 85-100 - (5)
  - 76-84 - (4)
  - 67-75 - (3)
  - 60-66 - (2)
  - 59-40 - necessary conditions for obtaining signatures.

### Knowledge evaluation after semester

The written part of the exam the students answer the questions. Written exam (more than 50% success rate), together with the seminar, presentation and explanation of the ways of solving involves makes success in the exam.

The final results of the exam to confirm the oral part.

### Remark

This course can be used for final thesis theme

### Prerequisites:

No prerequisites.
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>21795/22577</th>
<th>ECTS</th>
<th>6.0</th>
<th>Academic year</th>
<th>2017/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Water Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching mode</td>
<td>Lectures + exercises (auditory + laboratory + seminar + metodology + construction)</td>
<td>30+18 (10+8+0+0)</td>
<td>132</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td>Lectures: Stjepan Kordek dipl.ing.grad.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Auditory exercises: Stjepan Kordek dipl.ing.grad.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laboratory exercises: Stjepan Kordek dipl.ing.grad.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course objectives</td>
<td>Students will be able to recognize importance of preserving sanitary quality of drinking water, and will also be able to understand and independently solve problems related to the water conditioning process.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>1. evaluate basic problems relating to conditioning of drinking water. Level: 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. define differences between individual technological procedures for water conditioning. Level: 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. create basic elements of water conditioning devices, show practical knowledge relating to construction and maintenance of these devices. Level: 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. select technological procedure for specific cases of pollution to drinking water. Level: 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. manage water conditioning procedures on existing buildings/structures. Level: 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. define quantity of chemicals that are used in individual drinking water conditioning phases. Level: 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. propose necessary remedial works and interventions on existing water conditioning facilities. Level: 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out lectures</td>
<td>Other</td>
<td>Integration and expansion on acquired knowledge in the fields of water use, water protection and hydraulic structures for the purpose of gaining insight into the process of drinking water provision. Lectures are performed with aid of modern education tools and graphic presentations. A planned visit to a water conditioning plant (Zagreb, c, Virovitica, etc.).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out auditory exercises</td>
<td>Other</td>
<td>Solving tasks from areas explained in lectures.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods of carrying out laboratory exercises</td>
<td>Other</td>
<td>Visiting a laboratory which performs water analyses and learning about the process of determination of water quality.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course content lectures</td>
<td>1. Water quality according to Croatian and EU regulations, 2h, Learning outcomes: 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Natural water systems, surface waters and groundwater, 2h, Learning outcomes: 1, 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Raw water, drinking water, water for industry (technological, cooling, operational, etc.), water for irrigation, 2h, Learning outcomes: 1, 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Changes in water quality, water pollution, water contamination, aquatic communities and changes, eutrophication of water, 2h, Learning outcomes: 2, 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Drinking water - transfer of pathogenic microorganisms via water, 2h, Learning outcomes: 2, 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Water analysis and water quality assessment, 2h, Learning outcomes: 2, 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Water analysis and water quality assessment, 2h, Learning outcomes: 3, 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. I. preliminary exam., 2h, Learning outcomes: 1, 2, 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Water quality improvement., 2h, Learning outcomes: 3, 4, 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Water quality improvement., 2h, Learning outcomes: 3, 4, 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Water quality improvement., 2h, Learning outcomes: 3, 4, 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. Water purification facilities, 2h, Learning outcomes: 5, 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13. Water purification facilities, 2h, Learning outcomes: 5, 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14. Water purification facilities, 2h, Learning outcomes: 5, 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15. II. preliminary exam, 2h, Learning outcomes: 4, 5, 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course content auditory</td>
<td>1. Technological procedures of water conditioning, 2h, Learning outcomes: 1, 2, 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Technological procedures of water conditioning, 2h, Learning outcomes: 1, 2, 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Examples of sizing of water conditioning facilities and plants, 2h, Learning outcomes: 4, 5, 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Examples of sizing of water conditioning facilities and plants, 2h, Learning outcomes: 4, 5, 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Examples of sizing of water conditioning facilities and plants, 2h, Learning outcomes: 4, 5, 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course content laboratory</td>
<td>1. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Learning about the process of sampling and water analysis, 2h, Learning outcomes: 1, 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Learning about the process of sampling and water analysis, 2h, Learning outcomes: 3, 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Learning about the process of sampling and water analysis, 2h, Learning outcomes: 4, 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Learning about the process of sampling and water analysis, 2h, Learning outcomes: 6, 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>No lectures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Required materials**

- Basic: classroom, blackboard, chalk...
- Special purpose computer laboratory
- Whiteboard with markers
- Overhead projector
- Video equipment

**Exam literature**

- Basic literature:
- Additional literature:

**Students obligations**

- Redovito pohae nastave i najmanje 25% bodova iz kolokvija.
- Knowledge evaluation during semester: Redovito pohae nastave i najmanje 55% bodova iz kolokvija.
- Knowledge evaluation after semester: Ispit se sastoji iz pismenog i usmenog dijela. Uvjet za pristup usmenom dijelu ispita je najmanje 50% uspjeha na pismenom.
- Remark: This course can be used for final thesis theme
- Prerequisites: No prerequisites.
<table>
<thead>
<tr>
<th>Code WEB/ISVU</th>
<th>ECTS</th>
<th>Academic year</th>
</tr>
</thead>
<tbody>
<tr>
<td>21898/66756</td>
<td>6.0</td>
<td>2017/2018</td>
</tr>
</tbody>
</table>

**Name**: Wooden Engineering Structures

**Status**: 3rd semester - Polytechnic graduate professional study programme specialization in Civil Engineering (STARI Specijalisti graditeljstva) - elective course

**Teaching mode**: Lectures + exercises (auditory + laboratory + seminar + methodology + construction) work at home

**ECTS**

30+10 (10+0+0+0) 140

**Teachers**

Lectures: 1. prof.vis.šk. Boris Baljkas
Lectures: 2. doc. dr. sc. Dean Čizmar dipl. ing. grad.
Auditory exercises: doc. dr. sc. Dean Čizmar dipl. ing. grad.

**Course objectives**

Students will acquire knowledge needed for the design, analysis and realization of timber structures.

**Learning outcomes**:

1. Integrate knowledge gained in this course with the knowledge from mathematics, geotechnics, and structural analysis. Level: 6,7
2. Propose to client the facts that have to be adopted in order to select economically most favourable shape and system of the timber structure. Level: 6,7
3. Select the most favourable shape and static system for planar or spatial timber structures. Level: 7
4. Make analysis of all actions and combinations of actions acting on the structure. Level: 6,7
5. Propose and prove choice of all dimensions of a selected structure. Level: 6,7
6. Calculate mechanical resistance and usability of timber structures. Level: 6,7
7. Prepare detailed design and working design of planar, complex, and spatial timber structures. Level: 6,7

**Methods of carrying out lectures**

Ex cathedra teaching

**Methods of carrying out auditory exercises**

Computer simulations

**Course content lectures**

1. Structural reliability concept, 2h, Learning outcomes: 1
2. Wood as structural material, 4h, Learning outcomes: 1, 2
3. Durability of timber structures and fire protection, 4h, Learning outcomes: 1, 2
4. Materials for wooden structures and quality control, 2h, Learning outcomes: 2
5. Ultimate limit states, 2h, Learning outcomes: 1, 4
6. Structural properties of elements and connections, 2h, Learning outcomes: 1, 5, 6
7. Connections in timber structures, 4h, Learning outcomes: 1, 5, 6
8. Assembled elements, 2h, Learning outcomes: 5, 6
9. Timber-concrete composite girders, 2h, Learning outcomes: 4, 5, 6
10. Frame and arch systems, 4h, Learning outcomes: 3, 4, 5, 6
11. Spatial concepts: hyperbolic paraboloids, lattice structures, 2h, Learning outcomes: 3, 4, 5, 6
12.-
13.-
14.-
15.-

**Course content auditory**

1. Introduction about project. Description of a project, structural system of special shape laminated girders and guidelines., 2h, Learning outcomes: 1, 3
2. Load models and design according to Eurocode 5. Calculation and design of secondary element., 2h, Learning outcomes: 3, 4
3. Design of main structure according to ECS. Spatial stability of main structure., 2h, Learning outcomes: 3, 4
4. Numerical (spatial) model of main structure. Spatial stability., 2h, Learning outcomes: 3, 4, 5, 6
5. Numerical examples - design of main structure. 2h, Learning outcomes: 3, 4, 5, 6
7. Details of timber bridges, Example of details calculation., 2h, Learning outcomes: 7
8.-
9.-
10.-
11.-
12.-
13.-
14.-
15.-

**Required materials**

- Whiteboard with markers
- Overhead projector
- Video equipment

**Exam literature**

- Basic literature:
  2. Z. Zagor: DRVENE KONSTRUKCIJE I II, Pretei, d.o.o. Zagreb
- Additional literature:
### Students obligations
Maximum of 3 absences from exercises

### Knowledge evaluation during semester
- Design project
- Oral test

### Knowledge evaluation after semester
- Written exam
- Oral exam

### Remark
This course can be used for final thesis theme

### Prerequisites
No prerequisites.