Study Programme | Mechanical Engineering
--- | ---
Qualifications awarded | First degree
Professional title | Bachelor (appl.) in Civil Engineering
Number of ECTS credits | 180
Level of qualification according to the National Qualification Framework and the European Qualifications Framework | VS-1 (NQF)
First cycle (EQF)
Field of study | Engineering and technology
Mode of study | Full-time
Language of instruction | Serbian
Work-based learning | In the College laboratories equipped with state-of-the-art equipment;
In business systems whose main activities are relevant to the needs of this study programme.

Head of the study programme | Đorđe Đuričić, PhD

Programme objectives

The main objective of the study programme is to provide students with professional knowledge and skills necessary for work in civil engineering. They will have learnt how to put the knowledge acquired in different disciplines (mathematics, physics, mechanics, etc.) to practice, as well as how to prepare documents, presentations, calculations and simulations using common software tools. Students will have developed creative and critical thinking skills necessary for the analysis of engineering problems.

Programme outcomes

General outcomes:
- students develop skills necessary for the successful application of the knowledge acquired in other disciplines (mathematics, physics, mechanics, etc.);
- students develop professional competencies in different fields of civil engineering that will help them solve practical problems in real-world settings;
- students acquire both theoretical and practical knowledge on different methods and procedures that they can apply to practice;
- students can work successfully both individually and as team members.

Specific outcomes:
- students develop their understanding of manufacturing and thermal engineering;
- students are able to make connections between knowledge acquired in different fields in order to ensure a multidisciplinary approach to solving specific problems;
- students can successfully apply the acquired theoretical knowledge to production design, planning and management;
- the knowledge of foreign languages and information technology will help students
- improve the quality of their future work;
- students acquire the knowledge of international and national standards and regulations relating to production engineering;
- students acquire knowledge and develop their understanding of thermal technology;
- students can solve discipline-specific practical problems using knowledge acquired in different vocation-related subject areas, taking into account environmental protection and sustainable development;
- students can solve problems relating to designing, testing and maintenance of thermo-technical installations drawing on the acquired knowledge and gained experience, as well as foreign language proficiency and IT skills;
- students can understand professional literature, standards and other relevant information and use them when solving specific tasks in the field of thermal technology;
- students can apply occupational safety principles in order to reduce the risk of work-related injuries and diseases of workers;
- upon the completion of this study programme, students will have acquired the foundations for further education at specialist and higher-degree studies;
- upon the completion of this study programme students can qualify for the licence for responsible contracting engineers, granted by the Serbian Chamber of Engineers).
## Undergraduate Vocational Studies:
### CIVIL ENGINEERING

<table>
<thead>
<tr>
<th></th>
<th>Course Title</th>
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<tbody>
<tr>
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<td>Mathematics 1</td>
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<td>2</td>
<td>Physics</td>
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<td>3</td>
<td>Construction Mechanics</td>
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<td>4</td>
<td>Technical Drawing and Descriptive Geometry</td>
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<td>5</td>
<td>Construction Materials</td>
</tr>
<tr>
<td>6</td>
<td>Mathematics 2</td>
</tr>
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<td>7</td>
<td>Informatics Fundamentals</td>
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<td>8</td>
<td>Geodesy</td>
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<td>9</td>
<td>Strength of Materials</td>
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<tr>
<td>10</td>
<td>English</td>
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<tr>
<td>11</td>
<td>Russian</td>
</tr>
<tr>
<td>12</td>
<td>Hydraulic Engineering</td>
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<td>13</td>
<td>Building Construction</td>
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<td>14</td>
<td>Statics of Structures 1</td>
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<td>15</td>
<td>Concrete Structures 1</td>
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<tr>
<td>16</td>
<td>Occupational Safety</td>
</tr>
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<td>17</td>
<td>Visual Presentation Techniques</td>
</tr>
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<td>18</td>
<td>Soil Mechanics and Foundation Engineering</td>
</tr>
<tr>
<td>19</td>
<td>Sewage and Water Supply System Installation</td>
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<td>20</td>
<td>Roads</td>
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<td>21</td>
<td>Concrete Structures 2</td>
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<tr>
<td>22</td>
<td>Reconstruction, Addition and Adaptation of Space</td>
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<tr>
<td>23</td>
<td>Statics of Structures 2</td>
</tr>
<tr>
<td>24</td>
<td>Finishing Works</td>
</tr>
<tr>
<td>25</td>
<td>Organizing Construction Processes and Construction Mechanization</td>
</tr>
<tr>
<td>26</td>
<td>Metal Structures</td>
</tr>
<tr>
<td>27</td>
<td>Masonry and Timber Structures</td>
</tr>
<tr>
<td>28</td>
<td>Design Fundamentals</td>
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<tr>
<td>29</td>
<td>Construction Systems</td>
</tr>
<tr>
<td>30</td>
<td>Modern Construction Materials</td>
</tr>
<tr>
<td>31</td>
<td>Construction Technology</td>
</tr>
<tr>
<td>32</td>
<td>Computing in Civil Engineering</td>
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<tr>
<td>33</td>
<td>Construction Project Management</td>
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<tr>
<td>34</td>
<td>Bridges</td>
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<td>35</td>
<td>Environmental Protection</td>
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<tr>
<td>36</td>
<td>Final Thesis</td>
</tr>
</tbody>
</table>
**Study programme:** Civil Engineering

**Type and Level of Studies:** Undergraduate Vocational Studies

**Course code and title:** Bridges

**Teacher:** Furtula B. Boško, Teaching associate: Stojanović B. Trifko

**Course status:** Elective

**Number of ECTS credits:** 4

**Prerequisites:** Concrete Structures 1

**Course aims:** Introducing students to the fundamentals of the construction of bridges and providing them with fundamental knowledge about concrete bridges. This course will provide students with knowledge about basic elements of road and railroad bridges, with a brief overview of other types of bridges such as pedestrian, industrial, movable bridges. Modern constructive systems used in bridge construction are analysed. Special attention is paid to the preparation of a general plan of a bridge.

**Learning outcomes:** Developing skills required for proper execution and constructive design of bridges. Developing skills necessary for successful cooperation in the process of design, calculation and execution of the construction of reinforced concrete and pre-stressed concrete structures.

**Syllabus**

**Theoretical instruction:**

**Practical teaching:**
Auditory exercises, tasks relating to theoretical subject matter, survey preparation. Visiting construction sites.

**Literature:**
3. Veselin Kostić, Betonski mostovi, Građevinska knjiga, 1952.

**Number of active teaching classes:** 75

<table>
<thead>
<tr>
<th>Lectures: 45</th>
<th>Practical classes: 30</th>
<th>Other teaching forms:</th>
<th>Study research work:</th>
</tr>
</thead>
</table>

**Teaching methods:** Audio-visual, dialogue, monologue

**Knowledge evaluation (maximum 100 points)**

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity during lectures</td>
<td>5</td>
<td>Exam</td>
<td>50</td>
</tr>
<tr>
<td>Practical classes</td>
<td>25</td>
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<tr>
<td>Colloquia</td>
<td>20</td>
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</tr>
</tbody>
</table>

**Assessment methods:**
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Building Construction

Teacher (Surname, middle initial, name): Milivojević Lj. Dejan

Course status: Compulsory

Number of ECTS credits: 6

Prerequisites: none

Course aims: Acquiring knowledge on structure systems, separate structural assembly elements, their role, materials. Developing skills for the proper selection of materials, the most suitable structural assembly for the adopted concept design. Learning about modern methods of processing structural assemblies, their joints, sealing and insulation, traditional timber roofs, eave covers and gutters, roof ridge details, aired and unaired roofs, building physics elements.

Learning outcomes: The ability to analyse/systematise elements and assemblies in building construction and to find optimal solutions to structural assembly issues.

Syllabus

Theoretical instruction:

Practical teaching:
structural assemblies: massive, skeletal and mixed; selecting structural layout of buildings for the given base; variations of the selected layouts; selecting massive structures; graphical assignment; foundations; designing a projects/graphical presentation of the selected layout; sealing; the impact of water under pressure; the impact of moisture; sealing methods; graphical assignment; openings – external and internal; windows, shades, project-graphical assignment using the given data; reinforced concrete staircase: calculating stair parameters; tread and riser processing, railings; static schemes; reinforced concrete staircase: designing interior staircase with two flights of stairs and a landing; graphical assignment; traditional timber roofs; designing roof structures – project – base - cross-sections using the given base and data; traditional timber roofs: eave details – covering and gutters; ridge details; aired and unaired roofs, details.

Literature:

Number of active teaching classes: 60

<table>
<thead>
<tr>
<th>Lectures: 30</th>
<th>Practical classes: 30</th>
<th>Other teaching forms:</th>
<th>Study research work:</th>
</tr>
</thead>
</table>

Teaching methods: Auditory exercises, consultations, fieldwork, mentorship, literature review

Knowledge evaluation (maximum 100 points)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity during lectures</td>
<td>10</td>
<td>Exam</td>
<td>40</td>
</tr>
<tr>
<td>Practical classes</td>
<td>10</td>
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<tr>
<td>Colloquia</td>
<td>15+15</td>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>

**Assessment methods:**
Study programme: Civil Engineering

**Type and Level of Studies:** Undergraduate Vocational Studies

**Course code and title:** Computing in Civil Engineering

**Teacher (Surname, middle initial, name):** Zejak R. Radomir; Teaching associate: Đuričić V. Đorđe

**Course status:** Compulsory

**Number of ECTS credits:** 4

**Prerequisites:** none

**Course aims:** By mastering this course, students acquire basic knowledge about using computers for the analysis of civil engineering structures.

**Learning outcomes:** Mastering fundamental principles of structure modelling. Stress and strain calculation using state-of-the-art software packages. Drawing details of reinforcement bars and steel. Cost and bill of quantity calculation.

**Syllabus**

**Theoretical instruction:**
- Subject of study. Software packages for stress-strain analysis of structures.
- Using finite element method in civil engineering. Software packages.
- Calculation models, element types, entering data about structural support geometry, materials and loadings.
- Using TOWER software package for complex structures composed of linear and surface elements. Spatial structures.
- Foundation and soil modelling. Modifying parametres for structural computation.
- Analysis of computation results. Example of residential facility.
- Using TOWER software package for dimensioning of steel structures.
- ARMCAD software package. Basic tools.
- Using ARMCAD software package.
- METAL STUDIO software package. Basic tools.
- Using METAL STUDIO software package.
- NORMA BASE software package. Basic tools.
- Using NORMA BASE software package.

**Practical teaching:**
- Students work with computers and use software packages on their own. Preparation of a semestral assignment.

**Literature:**
1. Instructions for using the following software packages: TOWER, ARMCAD, METAL STUDIO, NORMA BASE

**Number of active teaching classes:** 75

<table>
<thead>
<tr>
<th>Lectures: 1x15=15</th>
<th>Practical classes: 4x15=60</th>
<th>Other teaching forms:</th>
<th>Study research work:</th>
</tr>
</thead>
</table>

**Teaching methods:** Auditory exercises, practical work demonstration using computers, workshops, semestral assignments, written exam

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum 100 points)</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Pre-exam obligations</td>
<td>Final exam</td>
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<tr>
<td>Activity during lectures</td>
<td>5</td>
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<tr>
<td>Colloquium 1</td>
<td>15</td>
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<tr>
<td>Colloquium 2</td>
<td>15</td>
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<tr>
<td>Seminar papers</td>
<td>15</td>
</tr>
</tbody>
</table>

**Assessment methods:**
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies – first level studies

**Course title:** Concrete Structures 2

**Teacher:** Furtula Boško; Teaching associate: Stojanović B. Trifko

**Course status:** Compulsory

**Number of ECTS:** 5

**Prerequisites:** Concrete Structures 1 and Statics of Structures 1

**Course aim:**
Introducing students to fundamentals of calculations and design of structures, reinforcement and refurbishment of damaged structures, as well as to the design of concrete, reinforced concrete and pre-stressed concrete structures.

**Course outcomes:**
Developing skills required for the proper execution, modelling and dimensioning of reinforced concrete and pre-stressed concrete structures. Developing cooperative skills necessary for the design, calculation and execution of reinforced concrete and pre-stressed concrete structures.

**Syllabus:**

**Theoretical instruction:**

**Practical instruction:**
Auditory exercises, tasks relating to the subject matter delivered through lectures, and preparation of surveys. Visits to construction sites.

**Literature:**
5. Eurocode 2-EN 2 za betonske konstrukcije - prevod

**Number of active teaching classes: 60**

| Lectures: 15x2=30 | Practical classes: 15x2=30 |

**Teaching methods:** audio-visual, monologue

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum number of points: 100)</th>
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<tbody>
<tr>
<td>Pre-exam obligations</td>
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<tr>
<td>Activity during lectures</td>
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<tr>
<td>Practical classes</td>
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<tr>
<td>Colloquium 1</td>
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<tr>
<td>Colloquium 2</td>
</tr>
</tbody>
</table>
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies – first level studies

**Course title:** Concrete Structures 1

**Teacher:** Furtula Boško; Teaching associate: Stojanović B. Trifko

**Course status:** Compulsory

**Number of ECTS:** 7

**Prerequisites:** Mechanics and Strength of Materials

**Course aim:**
Introducing students to calculation methods for the design of reinforced concrete structures. Mechanical, physical and rheological properties of materials making up reinforced concrete. Dimensioning procedures based on the Limit state theory and Classical theory. Introducing students to basic elements of reinforced concrete structures: columns, beams, plates, framework structures, and teaching them how to recognize constructive systems.

**Course outcomes:**
Developing skills required for the execution of concrete and reinforced concrete structures, including their modelling and dimensioning. Developing cooperative skills necessary for the design, calculation and execution of concrete and reinforced concrete structures.

**Syllabus:**
**Theoretical instruction:**

**Practical instruction:**
Auditory exercises, tasks relating to the subject matter delivered through lectures, and preparation of surveys. Visits to construction sites.

**Literature:**
5. Dušan najdanović, Milosavljević Branko, Zbirka rešenih zadataka iz betonskih konstrukcija.
6. Eurocode 2-EN 2 za betonske konstrukcije - prevod

**Number of active teaching classes:** 75

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practical classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 x 3 = 45</td>
<td>15 x 2 = 30</td>
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</tbody>
</table>

**Teaching methods:** audio-visual, monologue

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum number of points: 100)</th>
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</thead>
<tbody>
<tr>
<td>Pre-exam obligations</td>
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<tr>
<td>Activity during lectures</td>
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<td>Practical classes</td>
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<tr>
<td>Colloquium 1</td>
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<tr>
<td>Colloquium 2</td>
</tr>
</tbody>
</table>
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies – first level studies

**Course title:** Construction Materials

**Teacher:** Markičević M. Jelena; Teaching associate: Arsović D. Dragoslav

**Course status:** Compulsory

**Number of ECTS:** 6

**Prerequisites:** none

**Course aim:**
Acquiring fundamental knowledge about construction materials, i.e. knowledge about: material properties, testing methods, quality criteria they are supposed to satisfy. Learning about raw materials, technological processes of producing construction materials and their usage.

**Course outcomes:**
Developing the ability to apply the acquired knowledge to practice through proper selection and use of construction materials aimed at improving the quality, efficacy and duration of facilities.

**Syllabus:**

**Theoretical instruction:**

**Practical instruction:**
Auditory exercises. Computational tasks and analyses of results of laboratory testing in compliance with the subject matter delivered through lectures.
Laboratory exercises: testing and control of specific properties of construction materials in compliance both with valid standards and subject matter delivered through lectures.

**Literature:**

**Number of active teaching classes:** 60

| Lectures: 15x2=30 | Practical classes: 15x2=30 |

**Teaching methods:** dialogue, monologue, practical work demonstrations

**Knowledge evaluation (maximum number of points: 100)**

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
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<tbody>
<tr>
<td>Activity during lectures</td>
<td>5</td>
<td>Exam</td>
<td>55</td>
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<tr>
<td>Practical classes</td>
<td>15</td>
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<tr>
<td>Colloquium 1</td>
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<tr>
<td>Colloquium 2</td>
<td>15</td>
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</table>
**Study programme:** Civil Engineering  
**Type and level of studies:** Undergraduate Vocational Studies – first degree studies  
**Course title:** Construction Mechanics  
**Teacher:** Dragiša D. Mićić, Teaching Associate: Dragoslav D. Arsović  
**Course status:** Compulsory  
**Number of ECTS:** 6  
**Prerequisites:** None  
**Course aim:** Students master the principles of classical Newtonian mechanics.  
**Course outcomes:** By mastering mechanics, students acquire the necessary foundation for successful studying of other mechanics-related courses (Resistance of Materials, Machine elements, etc.).  

**Syllabus:**  
**Theoretical instruction:**  
DYNAMICS: Subject of study. Newton’s laws. Basic rasks in dynamics: the force is given and motion is to be determined; motion is given and the force is to be determined. Lof a point - laws and theorems. Fixed material point. D’Alambert’s principle.  

**Practical instruction:**  
There is no practical instruction.  

**Literature:**  
4. Lazar Rusov, Statika, Privredni pregled, Beograd.  
5. Dragan I. Milosavljević, Kinematika, Kragujevac.  
6. Miloš Kojić, Dinamika (Teorija i primeni), naučna knjiga, Beograd.  

<table>
<thead>
<tr>
<th>Number of active teaching classes: 60</th>
<th>Other classes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures: 2*15=30</td>
<td>Practical classes: 2*15=30</td>
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</table>

**Teaching methods:** Audio-visual; board and chalk  

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum number of points: 100)</th>
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</thead>
<tbody>
<tr>
<td>Pre-exam obligations Points Final exam Points</td>
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<tr>
<td>Attendance at lectures Up to 10 Exam Up to 50</td>
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<tr>
<td>Attendance at practical classes Up to 10</td>
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<tr>
<td>Activity during lectures and practical classes Up to 10</td>
</tr>
<tr>
<td>Graphical assignments</td>
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</tbody>
</table>
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies – first level studies

**Course title:** Construction Project Management

**Teacher:** Markičević M. Jelena; Teaching associate: Arsović D. Dragoslav, Andrijašević B. Aleksandar

**Course status:** Compulsory

**Number of ECTS:** 4

**Prerequisites:** none

**Course aim:**
Acquiring knowledge about basic categories and concepts of construction project management.

**Course outcomes:**
Developing skills necessary for applying the acquired knowledge in order to find optimal solutions in modern construction practice.

**Syllabus:**

**Theoretical instruction:**
Introduction. Investment projects, specificities and classification of construction projects, participants in project implementation, different approaches to project management, consulting services, defining a project (preparing technical documentation), construction project implementation management, trial production management, organizing project management, construction company organization model, construction regulations, computer-aided project management (MS Project).

**Practical instruction:**
Auditory exercises include the analysis of practical examples relating to the theoretical subject matter in this field and providing students with skills required for independent participation in construction project management.

**Literature:**
4. Law on planning and construction in the Republic of Serbia and other regulations relating to the subject matter of this course

**Number of active teaching classes:** 60

<table>
<thead>
<tr>
<th>Lectures: 15x2=30</th>
<th>Practical classes: 15x2=30</th>
</tr>
</thead>
</table>

**Teaching methods:** dialogue, monologue

**Knowledge evaluation (maximum number of points: 100)**

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
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<tr>
<td>Activity during lectures and practical classes</td>
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<td>Final exam</td>
<td>50</td>
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<tr>
<td>Seminar paper</td>
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<tr>
<td>Colloquium 1</td>
<td>10</td>
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<tr>
<td>Colloquium 2</td>
<td>10</td>
<td></td>
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</tr>
</tbody>
</table>
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Construction Technology

Teacher: Furtula B. Boško, Teaching associate: Stojanović B. Trifko
Andrijašević B. Aleksandar

Course status: Compulsory

Number of ECTS credits: 4

Prerequisites: Construction Materials

Course aims: Acquiring knowledge about basic categories and concepts relating to construction technology; learning about different types of work and methods used by civil engineers in practice.

Learning outcomes: The ability to use the acquired knowledge in order to find optimal solutions in modern construction practice and implement them on construction sites.

Syllabus

Theoretical instruction:

Practical teaching:
Auditory and graphical exercises imply the analysis of practical examples relating to the theoretical subject matter. Working individually, students prepare a survey about a technological process of construction for a specific example.

Literature:
3. Delević, K., Engi, Ž., Rešeni problemi iz organizacije i tehnologije građenja

Number of active teaching classes: 75
Lectures: 45 Practical classes: 30 Other teaching forms: Study research work:

Teaching methods: Audio-visual, dialogue, monologue

Knowledge evaluation (maximum 100 points)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity during lectures and practical classes</td>
<td>5</td>
<td>Written exam</td>
<td>50</td>
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<tr>
<td>Practical classes</td>
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<td>Oral exam</td>
<td>25</td>
</tr>
<tr>
<td>Colloquia</td>
<td>25</td>
<td></td>
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<tr>
<td>Seminar papers</td>
<td>15</td>
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</tbody>
</table>

Assessment methods:
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Constructive Systems

Teacher (Surname, middle initial, name): Furtula B. Boško, Teaching associate: Stojanović B. Trifko

Course status: Elective

Number of ECTS credits: 5

Prerequisites: none

Course aims: Acquiring knowledge necessary for selecting, designing, constructing and maintaining constructive systems in architecture.

Learning outcomes: The ability to select, design, construct and maintain constructive systems depending on the materials used. Mastering a systematic approach to the selection of constructive systems and construction technology under the given conditions.

Syllabus

Theoretical instruction:

Practical teaching:
Auditory exercises, tasks relating to the theoretical subject matter, and preparation of a survey. Visiting construction sites.

Literature:

Number of active teaching classes: 60

Other classes:

Lectures: 30
Practical classes: 30
Other teaching forms: Study research work:

Teaching methods:
Dialogue, monologue, demonstration of practical work

Knowledge evaluation (maximum 100 points)

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<thead>
<tr>
<th>Pre-exam obligations</th>
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<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity during lectures and practical classes</td>
<td>5</td>
<td>Exam</td>
<td>50</td>
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<tr>
<td>Survey defense</td>
<td>15</td>
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<tr>
<td>Colloquia</td>
<td>15+15</td>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>

Assessment methods:
**Study programme:** Civil Engineering

**Type and Level of Studies:** Undergraduate Vocational Studies

**Course code and title:** Design Fundamentals

**Teacher:** Milivojević Lj. Dejan; Teaching assistant: Stojanović B. Trifko

**Course status:** Elective

**Number of ECTS credits:** 5

**Prerequisites:** none

**Course aims:** Site analysis: man-made and natural factors, solar insolation, caloric values, topography, wind rose, traffic, infrastructure, urban design parameters, conceptual design of a building based on the site analysis results and urban design parameters. Developing students’ competency to perform the structural, dimensional and construction analysis of residential facilities; workplace concept, typical units, typical organization. Typology of residential facilities: collective, multi-family and single-family buildings. Different ways of grouping separate spatial units, starting from an apartment organization to a whole building design: basic façade composition principles – shape and materials.

**Learning outcomes:** Preparation of a conceptual design for a single-family residential facility, starting from urban design conditions to producing an architectural solution including all plans and a spatial model.

**Syllabus**

**Theoretical instruction:**

**Practical teaching:**
Introducing students to the task: a rest house project design. Introducing students to the site – site analysis. Conceptual design of the house on the site, orientation, traffic, etc. Conceptual design of the house: circulation diagram and interior organisation. Sketches: bases, cross-sections, etc. Sketches: form coordination – all plans. Adopting conceptual design. Elaboration of conceptual design. Discussion and assessment of the project.

**Literature:**
4. Uslovi i tehnička normativa za projektovanje stambenih zgrada i stanova.

**Number of active teaching classes:** 60

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practical classes</th>
<th>Other teaching forms</th>
<th>Study research work</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30</td>
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</tr>
</tbody>
</table>

**Teaching methods:** Auditory exercises, dialogue, consultations, fieldwork, mentorship, literature review

**Knowledge evaluation (maximum 100 points)**

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity during lectures</td>
<td>10</td>
<td>Exam</td>
<td>30</td>
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<tr>
<td>Practical classes</td>
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<tr>
<td>Colloquia</td>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>

**Assessment methods:**
Study programme: Civil Engineering

Type and level of studies: Undergraduate Vocational Studies

Course title: English

Lecturer: Marinković M. Ivana

Course status: Elective

Number of ECTS: 5

Prerequisites: None

Course aim: Acquiring the necessary level of General English knowledge, as well as of English for Specific Purposes; further development of language skills – speaking, reading, writing; providing students with skills required for spoken and written communication about topics relating to civil engineering.

Course outcomes: Application of acquired knowledge and skills in various situations. Ensuring continuous English language learning after high school. Acquiring the satisfactory level of foreign language proficiency.

Syllabus:

Theoretical instruction:

Practical instruction:

3. Student's Grammar (practice material by Dave Willis), 1991., Collins Cobuild
8. Praktikum (opšti deo), Bežbednost i zdravlje na radu, TEMPUS JPHES 158781, 2011.

Number of active teaching classes: 60

<table>
<thead>
<tr>
<th>Lectures: 2*15=30</th>
<th>Practical classes: 2*15=30</th>
<th>Other forms of instruction:</th>
<th>Research study:</th>
</tr>
</thead>
</table>

Teaching methods: Monologue, dialogue, combined method

Knowledge evaluation (maximum number of points: 100)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity during lectures</td>
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<td>50</td>
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<tr>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>

Other classes:

- Research study:

- Lectures: 2*15=30
- Practical classes: 2*15=30
- Other forms of instruction:
- Research study:
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies
Course code and title: ENVIRONMENTAL PROTECTION
Teacher (Surname, middle initial, name): Aksentijević M. Snezana; Teachnig associate: Tomić D. Milena
Course status: Elective
Number of ECTS credits: 4
Prerequisites: no

Course aims: to introduce students to the concept and content of the environment, the causes and consequences of pollution, the environmental protection system, terminology, legal regulations and environmental standards.

Learning outcomes: Training students for preventive and operational action, multidisciplinary approach to environmental issues, which will enable them to comprehensively, specifically and independently solve problems in their field of expertise.

Syllabus


Practical teaching: Practical examples that support theoretical subject matter in this field. Working on their own, students prepare an elaborate which includes solving specific problems.

Literature:

Number of active teaching classes: 60

<table>
<thead>
<tr>
<th>Lectures: 30</th>
<th>Practical classes: 30</th>
<th>Other teaching forms:</th>
<th>Study research work:</th>
</tr>
</thead>
</table>

Other classes:

Teaching methods: Lectures, exercises, assignments, projects, consultations.

Knowledge evaluation (maximum 100 points)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
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<tr>
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<tr>
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<tr>
<td>Seminar papers</td>
<td>10</td>
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</tbody>
</table>

Assessment methods:
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Finishing Works

Teacher (Surname, middle initial, name): Milivojević Lj. Dejan; Teaching associate: Papić V. Miloš

Course status: Compulsory

Number of ECTS credits: 6

Prerequisites: none

Course aims: Basic systematization of finishing works, solving tasks relating to designing details, preparing descriptions for priced bills of quantity, norms, regulations and construction methods.

Learning outcomes: The ability to design details, prepare priced bills of quantity. Introduction to procedures and dynamics of finishing works.

Syllabus

Theoretical instruction:
Rough works, craftworks; earthworks and masonry; concrete and reinforced concrete works + underground insulation; carpentry + light prefabricated structures – covering; insulation + sheet-metal works; carpentry + doors and windows + sunshade installation; locksmith works; review of learnt material; facade works + covering with stone + plastering-painting works; terrazzo works + flooring; sanitary rooms and fittings; introducing students to semestral assignments; mounting structural assemblies – selection of structural system; staircase design, roof structures.

Adjusting structural and architectural solutions, defining openings; elaboration of main project; designing specific facade details, covering details, inter-floor structures.

Literature:

Number of active teaching classes: 60

<table>
<thead>
<tr>
<th>Lectures: 30</th>
<th>Practical classes: 30</th>
<th>Other teaching forms: Study research work:</th>
</tr>
</thead>
</table>

Teaching methods: Auditory exercises/dialogue, consultations, fieldwork, mentorship, literature review

Knowledge evaluation (maximum 100 points)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
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<td>Practical classes</td>
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<tr>
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<tr>
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</table>

Assessment methods:
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies – first degree studies

**Course title:** Geodesy

**Teacher:** Aleksić D. Velimir

**Course status:** Compulsory

**Number of ECTS:** 6

**Prerequisites:** None

**Course aim:** Students master fundamental principles of measurement, as well as processing and using of obtained measurements when designing and constructing buildings.

**Course outcomes:** Students can work individually and as part of a team both in an office and in the field.

**Syllabus:**

**Theoretical instruction:**

**Practical instruction:**
Introducing students to measuring instruments, hands-on training in the use of instruments in the college laboratory and in the field, measurement data processing, preparation of geodetic surveys.

**Literature:**

**Number of active teaching classes:** 60

<table>
<thead>
<tr>
<th>Lectures: 2*15=30</th>
<th>Practical classes: 2*15=30</th>
<th>Other forms of instruction:</th>
<th>Research study:</th>
</tr>
</thead>
</table>

| Teaching methods: Dialogue and auditory methods. |

**Knowledge evaluation (maximum number of points: 100)**

<table>
<thead>
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<td>Practical classes</td>
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<tr>
<td>Fieldwork classes</td>
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<tr>
<td>Seminar paper</td>
<td>20</td>
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</tbody>
</table>
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Hydraulic Engineering

Teacher (Surname, middle initial, name): Zlatković M. Danijela

Course status: Compulsory

Number of ECTS credits: 6

Prerequisites: no

Course aims: Introducing students to the construction of hydraulic structures, and providing them with knowledge on water.

Learning outcomes: Providing students with a foundation for successful studying of other profession-specific courses.

Syllabus


Practical teaching: Organising visits to hydraulic structures – dams, reservoirs, flow regulation facilities, water supply systems, sewage systems, hydro power stations.

Literature:
3. Osnovi hidromehanike teorija i zadaci, Nedim Suljić, AMG Knjiga, 2014

Number of active teaching classes: 60

Lectures: 30  
Practical classes: 30  
Other teaching forms:  
Study research work:

Other classes:

Teaching methods: Auditory exercises, consultations, colloquia.

Knowledge evaluation (maximum 100 points)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
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<th>Final exam</th>
<th>Points</th>
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<td>Colloquia</td>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>

Assessment methods:
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies

**Course title:** Informatics Fundamentals

**Teacher:** Ivković V. Nebojša, Teaching associate: Knežević M. Dragana, Forst J. Đorđe

**Course status:** Compulsory

**Number of ECTS:** 6

**Prerequisites:** None

**Course aim:**
- Students will acquire advanced knowledge and will be trained to use:
  - MS Word
  - Adobe Photoshop
  - MS Excel
  - MS Power Point

**Course outcomes:**
- Students are trained to create and edit complex forms of written documents using MS Word programme:
  - Using sections (creating sections, working with sections, section properties)
  - Using section breaks in documents, together with header and footer
  - Changing the orientation of certain pages of a document
  - Using different number of columns on a single page and in a document as a whole
  - Designing styles (adding and removing text styles, saving and using them…)
  - Multilevel lists
  - Creating content (automatically and manually, adjusting text using TAB key)
  - Indexing
  - Bookmarks
  - Hyperlinks
  - Electronic forms
  - Circular letters
  - Preparing documents for double-sided printed (margins, page numbers)…
- Digital image processing using Adobe Photoshop, for documents prepared using MS Word.
- Spreadsheet design and different ways of automatic data processing applied to complex practical examples using nested functions in MS Excel programme. Advanced forms of graphic illustration of data processed using MS Excel. Using macros to create reports based on the processed data, imported from another information system.
- Creating advanced presentations in MS PowerPoint by inserting different forms of animations on slides.

**Syllabus:**

<table>
<thead>
<tr>
<th>Theoretical instruction</th>
<th>Practical instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MS Word</td>
<td>1. MS Word</td>
</tr>
<tr>
<td>2. Adobe Photoshop</td>
<td>2. Adobe Photoshop</td>
</tr>
<tr>
<td>3. MS Excel</td>
<td>3. MS Excel</td>
</tr>
<tr>
<td>4. MS Power Point</td>
<td>4. MS Power Point</td>
</tr>
</tbody>
</table>

**Literature:**
2. Excel 2007 Biblija, John Walkenbach, Mikro knjiga
3. Word 2016, Korak po korak, Joan Lambert, CET
4. PowerPoint 2010, Zvonko Aleksić, Kompjuter biblioteka

**Number of active teaching classes:** 60

<table>
<thead>
<tr>
<th>Lectures:</th>
<th>Practical classes:</th>
<th>Other forms of instruction:</th>
<th>Research study:</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
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</table>

**Teaching methods:**
During lectures, the theoretical part of the subject matter is illustrated by examples from practice. In the computer laboratory, students perform tasks relating to the theoretical instruction.

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum number of points: 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-exam obligations</td>
</tr>
<tr>
<td>Lecture attendance</td>
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<tr>
<td>Attendance at practical classes</td>
</tr>
<tr>
<td>Seminar paper</td>
</tr>
</tbody>
</table>
**Study programme:** Civil Engineering

**Type and Level of Studies:** Undergraduate Vocational Studies

**Course code and title:** Masonry and Timber Structures

**Teacher (Surname, middle initial, name):** Zejak R. Radomir, Teaching associate: Đuričić V. Đorđe

**Course status:** Elective

**Number of ECTS credits:** 5

**Prerequisites:** none

**Course aims:** This course provides students with fundamental knowledge about masonry and timber structures, as well as with their design, use and maintenance fundamentals.

**Learning outcomes:** Mastering basic principles of design and calculations of masonry and timber structures. Testing stability and usability of masonry and timber structures.

**Syllabus**

**Theoretical instruction:**

**Practical teaching:**
Performing tasks relating to delivered theoretical subject matter, and preparation of a survey about key issues.

**Literature:**
3. Evrokod 6, Proračun zidanih konstrukcija
6. Ilić, S., Klasični drveni krovovi, IRO Građevinska knjiga, Beograd
7. Other available literature and the Internet

**Number of active teaching classes:** 60

<table>
<thead>
<tr>
<th>Lectures: 30</th>
<th>Practical classes: 30</th>
<th>Other teaching forms:</th>
<th>Study research work:</th>
</tr>
</thead>
</table>

**Teaching methods:** Dialogue, monologue, demonstration of practical work using computers, calculation results analysis

**Knowledge evaluation (maximum 100 points)**

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
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<tbody>
<tr>
<td>Activity during lectures and practical classes</td>
<td>5</td>
<td>Exam</td>
<td>50</td>
</tr>
<tr>
<td>Practical classes</td>
<td>15</td>
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<tr>
<td>Colloquia</td>
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<tr>
<td>Seminar papers</td>
<td>15</td>
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</table>

**Assessment methods:**
Study programme: Civil Engineering

Type and level of studies: Undergraduate Vocational Studies

Course title: Mathematics 1

Teacher: Ljubica Ž. Diković, Teaching Assistant: Mitrašinović R. Dubravka

Course status: Compulsory

Number of ECTS: 6

Prerequisites: None

Course aim: Providing students with mathematical knowledge in the field of linear algebra, vector algebra and analytical geometry, which will support their study of other profession-related courses.

Course outcomes: Students will be able to use the acquired general mathematical knowledge independently in other general and vocational courses, as the theoretical and/or practical basis.

Syllabus:

Theoretical instruction:


Point. The distance between two points. The midpoint of a line. Dividing a line into segments in a given ratio. Plane. The equation of a plane perpendicular to a vector and passing through a point. The segmental form of a plane equation. The equation of a strand of a plane through the line of intersection of two planes. The distance from a point to a plane. The angle between two planes. Conditions for perpendicular and parallel planes. The intersection point of three planes. Straight line. General, vector, canonical and parametric forms of the equations of a straight line. The equation of a straight line passing through two points. The distance from a point to a plane. The angle between two straight lines. Conditions for perpendicular and parallel straight lines. The shortest distance between non-intersecting straight lines. Straight lines and planes. Different types of use.


Practical instruction:
Students perform the tasks relying upon the theoretical lectures; the theoretical knowledge is used to solve practical problems and tasks.

Literature:
Number of active teaching classes: 60

<table>
<thead>
<tr>
<th>Lectures:</th>
<th>Practical classes:</th>
<th>Other forms of instruction:</th>
<th>Research study:</th>
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<tbody>
<tr>
<td>2x15=30</td>
<td>2x15=30</td>
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</table>

Other classes:

**Teaching methods:** Ex cathedra, group work, interactive methods.

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum number of points 100)</th>
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</thead>
<tbody>
<tr>
<td>Pre-exam obligations</td>
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<td>----------------------</td>
</tr>
<tr>
<td>Class attendance</td>
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<tr>
<td>Colloquia</td>
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</tbody>
</table>
Study programme: Civil Engineering

Type and level of studies: Undergraduate Vocational Studies

Course title: Mathematics

Teacher: Ljubica Ž. Diković

Course status: Compulsory

Number of ECTS: 6

Prerequisites: Passed exam in Mathematics 1

Course aim: Mastering the mathematical knowledge in the field of differential and integral calculus, which will serve as the basis for the study of other general and profession-related courses.

Course outcomes: Developing students' ability to use the acquired higher mathematical knowledge independently in other general and vocational courses, as the theoretical and/or practical basis.

Syllabus:

Theoretical instruction:

- Functions of a real variable. Review of basic functions.
- Arrays. Boundary values of an array.
- Boundary values of functions. Left-hand and right-hand boundary values of functions. Infinitely small and infinitely large functions. Continuity of a function at a point and over an interval. Some important limits.

Practical instruction:

- Students perform the tasks relying upon the theoretical lectures; the theoretical knowledge is used to solve practical problems and tasks.

Literature:


Number of active teaching classes: 60

<table>
<thead>
<tr>
<th>Lectures: 2x15=30</th>
<th>Practical classes: 2x15=30</th>
<th>Other forms of teaching:</th>
<th>Research study:</th>
</tr>
</thead>
</table>

Teaching methods: Ex cathedra, group work, interactive methods.

Knowledge evaluation (maximum number of points: 100)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Class attendance</td>
<td>Up to 20</td>
<td>Oral exam</td>
<td>Up to 30</td>
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<tr>
<td>Colloquia</td>
<td>Up to 30</td>
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</table>
Study programme: Civil Engineering
Type and level of studies: Undergraduate Vocational Studies – first degree studies
Course title: Metal Structures
Teacher: Zejak R. Radomir, Teaching associate: Đuričić Đorđe
Course status: Compulsory
Number of ECTS: 7
Prerequisites: Strength of Materials
Course aim: Introducing students to fundamental principles of calculations, dimensioning and designing of metal structures.
Course outcomes: Students can design and construct metal structures using the acquired knowledge.

Syllabus:
Theoretical instruction:
Introducing metal structures, using steel structures. Steel types and grade designation.
Structural design calculation methods for steel structures.
Loading structures. Calculations aimed at determining behaviour of structural elements.
Dimensioning structural elements.
Steel structure elements under loading.
Sealants used for steel structures. Types and load-bearing capacity of sealants.
Rail extension. Extension fitting by screws.
Welding.
Angle connections.
Steel halls. Steel hall structure stability. Assembly, protection and maintenance of steel facilities.
Structural design calculations according to EC3.

Practical instruction:
Examples and tasks relating to theoretical instruction. Surveys about key topics.

Literature:

Number of active teaching classes: 75
Other classes:
Lectures: 2*15=30
Practical classes: 3*15=45
Other forms of instruction: Research study:

Teaching methods: Dialogue and auditory methods.

Knowledge evaluation (maximum number of points: 100)

<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
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<th>Points</th>
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<tbody>
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<td>Activity during lectures and practical classes</td>
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<td>Final exam</td>
<td>50</td>
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<tr>
<td>Survey defense</td>
<td>15</td>
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<tr>
<td>Colloquium 1</td>
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<tr>
<td>Colloquium 2</td>
<td>15</td>
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</tbody>
</table>
**Study programme:** Civil Engineering  
**Type and level of studies:** Undergraduate Vocational Studies – first level studies  
**Course title:** Modern Construction Materials  
**Teacher:** Markićević M. Jelena; Teaching associate: Andrijašević B. Aleksandar  
**Course status:** Elective  
**Number of ECTS:** 5  
**Prerequisites:** none  

**Course aim:**  
Improving and deepening students’ knowledge about construction materials, i.e. knowledge about material properties, testing methods, quality criteria they are supposed to satisfy, raw materials, technological processes of producing construction materials and their usage. The emphasis is placed on the importance of the proper selection and use of construction materials aimed at improving the quality, efficacy and duration of facilities.  

**Course outcomes:**  
Developing the ability to use the acquired knowledge in order to find optimal solutions when selecting materials for modern structures.  

**Syllabus:**  
**Theoretical instruction:**  
Fine ceramics, glass and other mineral-based materials, silicate material and products, special concrete and mortar (concrete with modified surface layers, high-strength concrete, concrete with special aggregates, micro-reinforced concrete, polymer-modified concrete and polymer concrete and mortar, special purpose mortar); ferrous metals and alloys (aluminum, copper, zink, lead; plastic mass (types of polymers, processing and production procedures, products used in civil engineering), anti-corrosion materials and systems, different types of glue.  

**Practical instruction:**  
Auditory exercises include the analysis of practical examples of standard testing of materials aimed at determining their quality; computational tasks for designing recipes and defining the composition of modern composite materials, testing optimal possibilities of using materials in modern construction.  

**Literature:**  

**Number of active teaching classes:** 60  
Lectures: 15x2=30  
Practical classes: 15x2=30  

**Teaching methods:** dialogue, monologue, practical work demonstration  

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum number of points: 100)</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-exam obligations</td>
<td></td>
<td>Final exam</td>
<td></td>
</tr>
<tr>
<td>Activity during lectures</td>
<td>5</td>
<td>Exam</td>
<td>50</td>
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<tr>
<td>Practical classes</td>
<td>30</td>
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<tr>
<td>Colloquium</td>
<td>15</td>
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</tbody>
</table>
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Occupational Safety

Teacher (Surname, middle initial, name): Marjanović M. Vesna, Teaching associate: Ivanović M. Danica

Course status: Elective

Number of ECTS credits: 5

Prerequisites: no

Course aims: Introducing students to the provisions of the Law on Occupational Safety and Health. Acquainting them with the most important dangers and hazards that can occur when performing tasks of specific jobs and the measures and means of protection that need to be implemented and applied so that the level of risk of injuries and health impairment is reduced and maintained at an acceptable level. Acquiring knowledge about occupational safety and health while performing construction works.

Learning outcomes: Knowledge of national regulations relating to occupational safety and health. The ability to identify hazards and dangers in the workplace, and by taking appropriate occupational safety and health measures, prevent, eliminate and reduce the risk of perceived dangers and hazards. Mastering occupational safety and health measures while performing construction works. Ability to plan and implement occupational safety and health measures while performing construction works.

Syllabus:

Theoretical instruction: Introduction to occupational safety (concept, subject and historical development of occupational safety). Legal framework for occupational safety and health (International law, National regulations: the Constitution of the Republic of Serbia, Law on Occupational Safety and Health). Work-related injuries, occupational ailments and work-related illnesses. Basic sources and causes of hazards and injuries at work: a) subjective causes, b) objective causes. Types and characteristics of harmful effects (harmful effects caused by psychic and psycho-physiological efforts, harmful effects related to the organization of work, harmful effects caused by other people, harmful effects caused by or arising in the process of work: physical (noise and vibrations), harmful effects of radiation (thermal, ionizing or non-ionizing, laser, ultrasonic), adverse effects of microclimate (temperature, humidity and air flow rate), inappropriate lighting, chemical hazards, dust and fumes, harmful effects caused by the use of dangerous materials and hazards (mechanical hazards occurring while using work equipment, hazards associated with workplace characteristics, hazards arising from the use of electricity, fire and explosion hazards) in the workplace and work environment, and means of protection. Occupational safety and health measures to be taken while carrying out construction works.

Practical teaching: Auditory and demonstration activities performed in specific business organisations where students can see practical examples of good and poorly organized occupational safety and health systems. Basic characteristics of OHSAS 18001, 2007.

Literature:
4. Drobnjak R. i grupa autora, Bezbednost i zdravlje na radu (knjige 1 do 6) za studente Visoke poslovno-tehničke škole strukovnih studija Užice, VPTŠ, TEMPUS JPHES 158781, 2010-2012.

Number of active teaching classes: 60

<table>
<thead>
<tr>
<th>Lectures: 30</th>
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<tbody>
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<td>Study research work:</td>
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</table>

Teaching methods: Dialogue, monologue, demonstration of practical work, work with text, literature review.

Knowledge evaluation (maximum 100 points)

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<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
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<tr>
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<td>Practical classes</td>
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<td>Colloquia</td>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>

Assessment methods:
Study programme: Civil Engineering

Type and level of studies: Undergraduate Vocational Studies – first level studies

Course title: Organising Construction Processes and Construction Mechanisation

Teacher: Markićević M. Jelena; Teaching associate: Arsović D. Dragoslav

Course status: Compulsory

Number of ECTS: 7

Prerequisites: none

Course aim:
Acquiring knowledge about: basic categories and principles of organizing construction processes, planning production in construction, basic types of construction machines and their optimal use.

Course outcomes:
Developing the ability to apply the acquired knowledge and skills to organizing construction processes in practice..

Syllabus:

Theoretical instruction:
Main principles of organizing construction processes, designing projects, programming construction of buildings, technical documentation, site conditions and local circumstances, supply chain and resource prices, off-site transportation, norms, cost analysis, priced bill of quantities, preparation works, site organization scheme, planning methods, network planning technique, linear programming, environmental protection, occupational safety and health in construction processes, fire protection, construction mechanization, classification of construction machines, calculation of technical performance, cost of mechanized work, selection of machines.

Practical instruction:
Auditory exercises: analysis of examples from practice in compliance with the subject matter delivered through lectures. Teaching students how to design construction organization projects and ensure optimal usage of mechanization.

Literature:

Number of active teaching classes: 75
Lectures: 15x3=45
Practical classes: 15x2=30

Teaching methods: dialogue, monologue, practical work demonstrations

Knowledge evaluation (maximum number of points: 100)

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<tr>
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<tr>
<td>Colloquia</td>
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</tbody>
</table>
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies – first degree studies

**Course title:** Physics

**Teacher:** Miloje S. Ćetković, Associate: Smiljanić M. Nataša

**Course status:** Compulsory

**Number of ECTS:** 6

**Prerequisites:** None

**Course aim:** Introducing students to mechanical, wave, heat, electromagnetic, optical, atomic and nuclear phenomena. They acquire the basis for studying technical sciences and discipline-specific courses.

**Course outcomes:** Students develop analytical skills necessary for the successful application of fundamental natural laws, as well as for understanding and solving simple versions of different engineering issues.

**Syllabus:**

**Theoretical instruction:**

**Practical instruction:**
The topics comply with theoretical instruction. Training students to use measurement instruments and devices.

**Literature:**
1. V. Vučić, D. Ivanović, Fizika I, II, III, Građevinska knjiga
7. D. Pavlović, Praktikum računskih vežbanja iz fizike, Naučna knjiga
8. V. Vučić, et al. Osnovna merenja u fizici, Naučna knjiga
9. V. Georgijević, Tehnička fizika, Zavod za izdavanje udžbenika i nastavna sredstva

**Number of active teaching classes:** 60

<table>
<thead>
<tr>
<th>Lectures: 2*15=30</th>
<th>Practical classes: 2*15=30</th>
<th>Other forms of instruction</th>
<th>Research study:</th>
</tr>
</thead>
</table>

**Teaching methods:** Dialogue, monologue, demonstration, practical assignments.

**Knowledge evaluation (maximum number of points: 100)**

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<thead>
<tr>
<th>Pre-exam obligations</th>
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<th>Points</th>
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<td>Activity during lectures</td>
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<td>Practical classes</td>
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<td>Colloquia (2x10)</td>
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</tbody>
</table>
**Study programme:** Civil Engineering

**Type and level of studies:** Undergraduate Vocational Studies

**Course title:** Reconstruction, Addition and Adaptation of Space

**Teacher:** Ćirović Ivana, Markićević M. Jelena; Teaching associate: Stojanović B. Trifko, Stefanović R. Katarina

**Course status:** Elective

**Number of ECTS:** 5

**Prerequisites:** none

**Course aim:**
Introducing students to main issues faced in reconstruction, addition and adaptation of a space. Providing them with skills required for minor and major interventions in already built facilities.

**Course outcomes:**
Students will be able to work on their own and design reconstruction, addition and adaptation of facilities used for different purposes, and of construction systems. Students will be familiar and able to use different materials and techniques during the process of reconstruction, addition and adaptation. They will understand the complex nature of minor and major interventions in existing facilities while changing or not changing the purpose of their use.

**Syllabus:**

**Theoretical instruction:**
Defining structural and non-structural components of existing facilities. Survey of existing conditions and project design. Reconstruction aimed at changing use of facility, as well as to solving problems caused by different influences: uneven soil compaction, earthquake effects, inadequate building or maintenance, fire or age of building itself, its structure.

Adaptation: demolition and rebuilding of partition walls; replacement of devices, equipment and installations with same-capacity ones. Treatment of floor, wall and ceiling surfaces during space adaptation. Changing structure and organisation of space. Adapting existing space to new standards and regulations. Adapting existing space to persons with disabilities.

Reconstruction of floors, walls and ceilings. Treatment of structural and non-structural components during reconstruction. Changing dimensions of existing openings and making new openings. Replacing installations, equipment and devices with higher-capacity ones. Installing elevators in buildings. Making roof windows. Changing structural components. Making or closing openings in structural elements. Changing use of interior and its adjustment to standards and regulations governing new use: changing residential space into public one, public into residential or public into public changing its use (e.g. changing production plant into showroom, etc.).

Standards and norms for spaces used for different purposes: residential and public facilities (hospitality, sports, business, education facilities, showrooms, traffic terminals, etc.). Minor interventions in facilities: regular interior maintenance works; painting, replacing sanitary fittings, radiators, etc.

Adding new space outside existing one, or adding new space to existing one so that they make structural, functional and aesthetic whole.

**Practical instruction:**
Performing a comparative theoretical analysis of architectural solutions in the processes of reconstruction, addition and adaptation of a space using relevant examples from national and international architectural practice.

Preparing a seminar paper on a given topic, as well as a conceptual design for reconstruction or addition.

**Literature:**

<table>
<thead>
<tr>
<th>Number of active teaching classes: 60</th>
<th>Lectures: 15x2=30</th>
<th>Practical classes: 15x2=30</th>
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</thead>
</table>

**Teaching methods:** Lectures with visual illustrations, individual research on a given topic, workshops, discussion, conceptual design for reconstruction or addition, individual consultations and corrections, design assessment with active participation of students.

**Knowledge evaluation (maximum number of points: 100)**

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<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
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<td>Semestral assignment</td>
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<td>Seminar paper</td>
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</tbody>
</table>
**Study programme:** Civil Engineering  
**Type and level of studies:** Undergraduate Vocational Studies – first degree studies  
**Course title:** Roads  
**Teacher:** Lučić Č. Dragan, Teaching associate: Arsović D. Dragoslav  
**Course status:** Compulsory  
**Number of ECTS:** 6  
**Prerequisites:** None  

**Course aim:** Introducing students to the preparation and necessary elements of project documentation, parts of road and railway systems, engineering facilities in civil engineering construction, earthwork methods and other activities.  

**Course outcomes:** Students are competent enough to read and elaborate the projects of roads, railroads and tunnels, as well as to organize civil engineering construction works.  

**Syllabus:**  
**Theoretical instruction:**  

**Practical instruction:**  
Introducing students to examples from practice (project documentation), preparation of seminar papers on topics relating to road design.  

**Literature:**  
2. A. Cvetanović, Borivoje Banić, Osnove saobraćajnica, Građevinski fakultet Univerziteta u Beogradu, Internet izdanje.  
8. M. Ninčić, Skripta sa predavanaj iz predmeta Saobraćajnice na Višoj tehničkoj školi u Užicu  

**Number of active teaching classes:** 75  
**Other classes:**  
**Teaching methods:** Dialogue, monologue, practical work demonstration, work with text, literature review.  
**Knowledge evaluation (maximum number of points: 100)**  

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<tr>
<th>Pre-exam obligations</th>
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<td>Practical classes</td>
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<td>Colloquia (2x10)</td>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>
**Study programme:** Civil Engineering  
**Type and level of studies:** Undergraduate Vocational Studies  
**Course title:** Russian I  
**Teacher:** Terzić V. Svetlana  
**Course status:** Elective  
**Number of ECTS:** 5  
**Prerequisites:** None  

**Course aim:** Teaching students how to use specialized literature related to their field of expertise; developing all language skills (reading, translation, conversation); combining lexical and grammatical structures. Increasing public awareness of the importance of civil engineering through specialized texts.  

**Course outcomes:** Providing continuous foreign language education upon high school completion. Developing communication skills and the skills that will enable students to use specialized literature.  

**Syllabus:**  
**Theoretical instruction:**  
Airport – parts of speech that decline; Customs – nouns (three types); Phone conversation – adjectives (hard and soft declension); At the post office – the comparative degree; Commercial letters; Hotel – the superlative degree; At the restaurant – verbs of motion; International fairs and exhibitions – adverbs of manner; The theatre life of Moscow – the imperative mood. The protection of workers - taking personal protection measures and informing workers about protection signs (the implementation of the international project TEMPUS JPHES 158781)  

**Practical instruction:**  
Grammar revision. Practicing conversation in unfamiliar situations.  

**Literature:**  
4. Terzić S., 2006, Odabrani tekstovi iz ruskog jezika struke, VPTŠ Užice  

**Number of active teaching classes: 60**  
<table>
<thead>
<tr>
<th>Lectures: 30</th>
<th>Practical classes: 30</th>
<th>Other forms of instruction:</th>
<th>Research study:</th>
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</table>

**Teaching methods:** Monologue and dialogue-based methods.
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Water Supply and Sewerage System Installation

Teacher (Surname, middle initial, name): Milivojević Lj. Dejan, Teaching associate: Papić V. Miloš

Course status: Compulsory

Number of ECTS credits: 5

Prerequisites: none

Course aims: Acquiring fundamental knowledge relating to water supply and sewage system installation: designing specifications, preparing details for the priced bill of quantities.

In-house installations – water supply and sewage systems; designing internal distribution of pipes and connecting it with external pipework system; hydraulic calculations; rules, norms, construction methods.

Learning outcomes: The ability to design projects of home water supply and sewage system installations, as well as to prepare the priced bill of quantities for finishing works and construction specifications.

Syllabus

Theoretical instruction:
Sewage system: exterior pipework, urban sewage collection systems, conditions for their connection with internal sewage distribution of pipes; sewage pipework: internal distribution of pipes, rules of connection, types of pipes, pipe distribution methods, cascade systems, revision.

Water supply system: external connections, urban network, water supply, pumps and other mechanical water supply network devices. Internal water supply network, fittings, connection with external network.

Water supply system: designing internal water supply system, rules, fundamentals of hydraulic calculations.

Other in-house installations: heating, air conditioning, electrical installations.

Practical teaching:
Situational plan of a building in compliance with the external network of installations; plan of internal sewage system – the basis of the semestral assigment; connection with external network - urban sewage collection systems; designing internal water supply and sewage systems, connection with external distriction of pipes, hydraulic calculations.

Literature:

Number of active teaching classes: 45

Lectures: 30  Practical classes: 15  Other teaching forms:  Study research work:

Teaching methods: Auditory exercises, dialogue, consultations, fieldwork, mentorship, literature review

Knowledge evaluation (maximum 100 points)

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<tr>
<th>Pre-exam obligations</th>
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<th>Points</th>
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</table>

Seminar papers

Assessment methods:
Study programme: Civil Engineering

Type and level of studies: Undergraduate Vocational Studies – first level studies

Course title: Soil Mechanics and Foundation Engineering

Teacher: Markićević M. Jelena; Teaching associate: Đurićčić Đorđe

Course status: Compulsory

Number of ECTS: 6

Prerequisites: none

Course aim: Acquiring knowledge on materials which make up soil, as well as knowledge on the construction of foundations for different structures.

Course outcomes: Mastering fundamental knowledge and principles of soil mechanics and foundation engineering, and developing skills required for their application to design and construction.

Syllabus:

Theoretical instruction:

Practical instruction:
Auditory exercises: tasks and examples relating to theoretical subject matter delivered through lectures. Students prepare a survey working individually, and it consists of specific tasks representing key issues.

Literature:

Number of active teaching classes: 75

<table>
<thead>
<tr>
<th>Lectures: 15x3=45</th>
<th>Practical classes: 15x2=30</th>
</tr>
</thead>
</table>

Teaching methods: dialogue, monologue

Knowledge evaluation (maximum number of points: 100)

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<tr>
<th>Pre-exam obligations</th>
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<tbody>
<tr>
<td>Activity during lectures</td>
<td>5</td>
<td>Exam</td>
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<tr>
<td>Practical classes</td>
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<td>Colloquium 1</td>
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<tr>
<td>Colloquium 2</td>
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</tbody>
</table>
**Study programme:** Civil Engineering

**Type and Level of Studies:** Undergraduate Vocational Studies

**Course code and title:** Statics of Structures 1

**Teacher (Surname, middle initial, name):** Milašinović D. Dragan, Teaching associate: Arsović D. Dragoslav

**Course status:** Compulsory

**Number of ECTS credits:** 7

**Prerequisites:** passed exams in Mechanics and Strength of Materials

**Course aims:** Teaching students how to analyze stress, deformation and stability of structures drawing upon the laws on the mechanics of rigid and deformable bodies.

**Learning outcomes:** Students will be able to calculate shear force and deformation, and they will understand spatial stability of structural supports. Helping students to understand calculation methods used for dimensioning of structural supports.

**Syllabus**

**Theoretical instruction:**

**Practical teaching:**
Performing tasks in statics of structures in compliance with theoretical instruction.

**Literature:**

**Number of active teaching classes:** 75

<table>
<thead>
<tr>
<th>Lectures: 30</th>
<th>Practical classes: 45</th>
<th>Other teaching forms:</th>
<th>Study research work:</th>
</tr>
</thead>
</table>

**Teaching methods:** Dialogue, monologue

**Knowledge evaluation (maximum 100 points)**

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<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
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<tbody>
<tr>
<td>Activity during lectures</td>
<td>10</td>
<td>Exam</td>
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<tr>
<td>Practical classes</td>
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<tr>
<td>Seminar papers</td>
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</tbody>
</table>

**Assessment methods:**
Study programme: Civil Engineering

Type and Level of Studies: Undergraduate Vocational Studies

Course code and title: Statics of Structures 2

Teacher (Surname, middle initial, name): Milašinović D. Dragan; Teaching associate: Arsović D. Dragoslav

Course status: Elective

Number of ECTS credits: 5

Prerequisites: passed exams in Statics of Structures 2

Course aims: Teaching students how to analyze stress, deformation and stability of structures drawing upon the laws on the mechanics of rigid and deformable bodies.

Learning outcomes: Students will be able to calculate shear force and deformation, and they will understand spatial stability of structural supports. Helping students to understand calculation methods used for dimensioning of structural supports.

Syllabus

Theoretical instruction:
Theories of reciprocity. Statically indeterminate supports – force method, statically indeterminate variables and basic system of box and plate girders, equations. Statically indeterminate supports – approximate deformation method, statically indeterminate variables and basic system of box and plate girders, equations. Diagrams of motion of statically indeterminate supports. Influence lines of statically indeterminate supports. Static and kinematic indeterminacy.

Practical teaching:
Performing tasks in statics of structures in compliance with theoretical instruction.

Literature:

Number of active teaching classes: 60
Lectures: 30  Practical classes:30  Other teaching forms:  Study research work:

Teaching methods: Dialogue, monologue

Knowledge evaluation (maximum 100 points)

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<tr>
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<tr>
<td>Seminar papers</td>
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</table>

Assessment methods:
**Study programme:** Civil Engineering  
**Type and level of studies:** Undergraduate Vocational Studies – first degree studies  
**Course title:** Strength of Materials  
**Teacher:** Zejak R. Radomir, Teaching associate: Đuričić Đorđe  
**Course status:** Compulsory  
**Number of ECTS:** 7  
**Prerequisites:** Construction Mechanics  

**Course aim:** Students acquire knowledge on the resistance of materials, which serves as the foundation for further study of profession-specific courses.  

**Course outcomes:** Students master fundamental principles of mechanical behaviour of rigid, deformable, beam structures, dimensioning of structural members and the structure as a whole.  

**Syllabus:**  
**Theoretical instruction:**  

**Practical instruction:**  
Examples and tasks relating to theoretical instruction. The survey that students prepare individually consists of typical tasks relating to key topics.  

**Literature:**  

**Number of active teaching classes:** 75  
**Other classes:**  
**Teaching methods:** Dialogue and auditory methods.  

**Knowledge evaluation (maximum number of points: 100)**  

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<tr>
<th>Pre-exam obligations</th>
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<th>Final exam</th>
<th>Points</th>
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<tbody>
<tr>
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<tr>
<td>Survey defense</td>
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</tbody>
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Study programme: Civil Engineering

Type and level of studies: Undergraduate Vocational Studies

Course title: Technical Drawing and Descriptive Geometry

Teacher: Ćirović Ivana; Teaching associate: Stojanović Trifko

Course status: Compulsory

Number of ECTS: 6

Prerequisites: none

Course aim:
Introducing students to basic methods and rules of technical drawing. Providing students with necessary knowledge about graphical solutions to geometry problems. Developing students’ ability of reading 2D technical drawings. Improving their perceptions of space and proportion. Providing knowledge in different fields of descriptive geometry: parallel projection (orthogonal, oblique and isometric). Developing spatial visualization and spatial imagination skills, as well as the ability to solve problems of different spatial relationships between three-dimensional geometric objects projected onto a two-dimensional plane, which is the basis of spatial analysis of any two-dimensional representation.

Course outcomes:
Students will be able to perceive space and objects, representations of orthogonal and oblique projection, as well as to select the appropriate technique for the required technical documentation. Students will have developed skills to identify and interpret spatial relationships of spatial shapes in two-dimensional representations, and will be familiar with their geometric structure. Students will be able to provide optimal graphical representation of spatial configurations in characteristic perspectives and views.

Syllabus:

Theoretical instruction:

Practical instruction:

Literature:

Number of active teaching classes: 75  Lectures: 15x2=30  Practical classes: 15x3=45

Teaching methods: Lectures with visual illustrations, graphical drawing, individual consultations and
<table>
<thead>
<tr>
<th>Pre-exam obligations</th>
<th>Points</th>
<th>Final exam</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity during lectures</td>
<td>Up to 5</td>
<td>Written exam</td>
<td>Up to 55</td>
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<tr>
<td>Practical classes</td>
<td>Up to 15</td>
<td>Oral exam</td>
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<tr>
<td>Colloquium</td>
<td>Up to 25</td>
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<tr>
<td>Seminar paper</td>
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<tr>
<td><strong>Study programme:</strong></td>
<td>Civil Engineering</td>
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<tr>
<td><strong>Type and level of studies:</strong></td>
<td>Undergraduate Vocational Studies</td>
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<tr>
<td><strong>Course title:</strong></td>
<td>Visual Presentation Techniques</td>
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<tr>
<td><strong>Teacher:</strong> Čirović Ivana; <strong>Teaching associate:</strong> Đuričić V. Đorđe</td>
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<tr>
<td><strong>Course status:</strong></td>
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<tr>
<td><strong>Number of ECTS:</strong></td>
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<tr>
<td><strong>Prerequisites:</strong></td>
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<tr>
<td><strong>Course aim:</strong></td>
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<tr>
<td>Introducing students to basic methods of technical drawing used in the preparation of conceptual and final designs (bases, cross-sections, appearance, details). Developing and cherishing art and visual culture. Improving students’ perceptions of space and proportion. Refining students’ understanding of composition. Developing skills to create architectural presentations using basic computer techniques. Providing students with necessary knowledge about graphical solutions to geometry-related problems. Developing students’ 2D technical drawing reading skills.</td>
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<td><strong>Course outcomes:</strong></td>
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<tr>
<td>Students will be able to realize the complexity of an object or a space and select the appropriate method of representing spatial data. Students will be able to perceive space and objects, and to represent them using orthogonal projection. Students will be familiar with basic methods of technical drawing used in the preparation of a conceptual and final design (bases, cross-sections, appearance, details). Students will have acquired knowledge necessary for graphical representation of civil engineering facilities on a plane, as well as for the preparation of proper technical documentation. Students will be familiar with computer graphics basics and will know how to use input and output devices. Students will use computers to organize and process raster and vector graphics obtained by means of input devices. Students are able to use appropriate conceptual design presentation techniques on their own.</td>
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<tr>
<td><strong>Syllabus:</strong></td>
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<td><strong>Theoretical instruction:</strong></td>
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<tr>
<td>Introducing students to basic methods of technical drawing used in the preparation of conceptual and final designs (bases, cross-sections, appearance, details). Architectural presentations. Drawing spatial shapes. Students simultaneously explore technical and expressive possibilities of both traditional techniques and computer graphics. The role of computers in engineering design.</td>
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<td><strong>Practical instruction:</strong></td>
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<td>Students master theoretical subject matter through graphical representations of conceptual and final designs, i.e. by preparing conceptual and final design projects of civil engineering facilities using traditional drawing techniques and computers. Students are trained how to prepare the graphical part of technical documentation working on their own. Graphical representation of spatial shapes on a two-dimensional plane of a drawing. Graphical representation of objects in a space. Developing 2D technical drawing reading skills. Computer applications used for architectural presentations. Introducing students to basic software packages for drafting, designing and spatial modeling. Basic tools and methods for 2D drawing and representation of architectural structures. Software packages for the preparation of technical documentation and architectural presentations. 3D modelling tools for architectural forms. Fundamentals of the actual representation of architectural facilities.</td>
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<tr>
<td><strong>Literature:</strong></td>
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<tr>
<td><strong>Number of active teaching classes:</strong></td>
<td>60</td>
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<tr>
<td><strong>Lectures:</strong> 15x2=30</td>
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<tr>
<td><strong>Practical classes:</strong> 15x2=30</td>
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</tbody>
</table>
**Teaching methods:** Lectures with visual illustrations, workshops, presentations of conceptual designs for given topics, individual consultations and corrections.

<table>
<thead>
<tr>
<th>Knowledge evaluation (maximum number of points: 100)</th>
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<tbody>
<tr>
<td><strong>Pre-exam obligations</strong></td>
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