## Study program: PRODUCTION ENGINEERING (3 years)

### I Semester - First year

#### Mandatory subjects

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>ECTS</th>
<th>Hours</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics I</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
</tr>
<tr>
<td>Mechanical materials</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
</tr>
<tr>
<td>Computer Science</td>
<td>6</td>
<td>2+2+1</td>
<td>156</td>
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<tr>
<td>Elective subject from the faculty 1</td>
<td>4</td>
<td>2+1+1</td>
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<td><strong>Total:</strong></td>
<td>30</td>
<td>12+8+7</td>
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</table>

### I Semester - First year

#### Elective subjects

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>ECTS</th>
<th>Hours</th>
<th>Total</th>
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<tbody>
<tr>
<td>Basics of Physics</td>
<td>4</td>
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<td>120</td>
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<tr>
<td>Physics II</td>
<td>4</td>
<td>2+1+1</td>
<td>120</td>
</tr>
<tr>
<td>Electrotechnics and elektronics</td>
<td>4</td>
<td>2+1+1</td>
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<tr>
<td>Casting technology</td>
<td>4</td>
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### II Semester - First year

#### Mandatory subjects

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<tr>
<th>SUBJECTS</th>
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<tbody>
<tr>
<td>Mathematics II</td>
<td>8</td>
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<tr>
<td>Engineering graphics</td>
<td>6</td>
<td>2+2+1</td>
<td>156</td>
</tr>
<tr>
<td>Technical Mechanics I (statics)</td>
<td>6</td>
<td>2+2+1</td>
<td>156</td>
</tr>
<tr>
<td>Elective subject from the faculty 3</td>
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<tr>
<td>Elective subject from the University 1</td>
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<td>Sports and Recreation</td>
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<td>30</td>
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### II Semester - First year

#### Elective subjects

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<th>SUBJECTS</th>
<th>ECTS</th>
<th>Hours</th>
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<tbody>
<tr>
<td>The modern mechanical materials</td>
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<td>Engineering logistics</td>
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<td>III Semester - Second year</td>
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<tr>
<td><strong>SUBJECTS</strong></td>
<td>ECTS</td>
<td>Hours</td>
<td>Total</td>
</tr>
<tr>
<td>Thermodynamics</td>
<td>8</td>
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<tr>
<td>Strength of materials</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
</tr>
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<td>Technical Mechanics II (kinematics, dynamics, oscillations)</td>
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<td>2+2+1</td>
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<td>Elective subject from the faculty 5</td>
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<tr>
<td><strong>SUBJECTS</strong></td>
<td>ECTS</td>
<td>Hours</td>
<td>Total</td>
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<tr>
<td>Corrosion and corrosion protection</td>
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<tr>
<td>Probability and statistics</td>
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<tr>
<td>Ergonomics</td>
<td>4</td>
<td>2+1+1</td>
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<td>Industrial Management</td>
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<td>2+1+1</td>
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<tr>
<td><strong>SUBJECTS</strong></td>
<td>ECTS</td>
<td>Hours</td>
<td>Total</td>
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<tr>
<td>Machine elements</td>
<td>8</td>
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<tr>
<td>Fluid Mechanics</td>
<td>6</td>
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<tr>
<td>Numerical methods</td>
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<td>2+2+1</td>
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<tr>
<td><strong>SUBJECTS</strong></td>
<td>ECTS</td>
<td>Hours</td>
<td>Total</td>
</tr>
<tr>
<td>Measurement and measuring instruments</td>
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<tr>
<td>Heat transfer</td>
<td>4</td>
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### V Semester - Third year

**Mandatory subjects**

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</thead>
<tbody>
<tr>
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<tr>
<td>Processing using cutting and plastic deformation</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
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<tr>
<td>CAD technology</td>
<td>6</td>
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**Elective subjects**

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>ECTS</th>
<th>Hours</th>
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</thead>
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<tr>
<td>Sustainable energy systems</td>
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<tr>
<td>Machinery for transport</td>
<td>4</td>
<td>2+1+1</td>
<td>120</td>
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<tr>
<td>Engineering economics</td>
<td>4</td>
<td>2+1+1</td>
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<tr>
<td>Basics of internal combustion engines</td>
<td>4</td>
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**VI Semester - Third year**

**Mandatory subjects**

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<thead>
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<th>SUBJECTS</th>
<th>ECTS</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>Machines and tools for plastic processing</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
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<tr>
<td>Metal cutting machines and devices</td>
<td>6</td>
<td>2+2+1</td>
<td>156</td>
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<tr>
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**Elective subjects**

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>ECTS</th>
<th>Hours</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Mechatronics</td>
<td>4</td>
<td>2+1+1</td>
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<tr>
<td>Waste management</td>
<td>4</td>
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Annex No.3

<table>
<thead>
<tr>
<th>Program of the Course - first cycle studies</th>
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<table>
<thead>
<tr>
<th></th>
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<th>Mathematics 1</th>
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<tr>
<td>2</td>
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<td>3</td>
<td>Study Program</td>
<td>Production Engineering / Transport, Organization and Logistics</td>
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<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering - Vinica</td>
</tr>
<tr>
<td>4</td>
<td>Cycle (first, second and third cycle)</td>
<td>First cycle</td>
</tr>
<tr>
<td>5</td>
<td>Academic year / semester</td>
<td>first/first</td>
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<tr>
<td>6</td>
<td>Number of credits</td>
<td>8</td>
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<tr>
<td>7</td>
<td>Professor (s)</td>
<td>Prof. Jordan Zivanovik PhD</td>
</tr>
<tr>
<td>8</td>
<td>Requirements for enrollment the Course</td>
<td>no</td>
</tr>
<tr>
<td>9</td>
<td>Purposes of the curriculum (competencies):</td>
<td>Upgrading high school mathematics knowledge and introduction to higher mathematics</td>
</tr>
<tr>
<td>11</td>
<td>Learning methods:</td>
<td>Lectures, laboratory exercises, numerical exercises, e-learning, seminar work, teamwork, consultation</td>
</tr>
<tr>
<td>12</td>
<td>Total available time</td>
<td>216 hours</td>
</tr>
<tr>
<td>13</td>
<td>Distribution of available time</td>
<td>3+2+2 / per week</td>
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<td>14</td>
<td>Forms of teaching / learning activities</td>
<td>15.1. lectures / theoretical - contact teaching, e-teaching</td>
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<td>15.2. theoretical and practical exercises,</td>
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<tr>
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<td>3</td>
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<tr>
<td>16</td>
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</table>
### 16. Other forms of activities

| 16.1. | Project tasks | 1 |
| 16.2. | Individual tasks | 1 |
| 16.3. | Home learning |

### 17. Method of assessment

| 17.1. | Tests / oral exams | 70 points |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. | Activity and participation | 20 points |

### 18. Assessment Criteria (points / score)

- **up 50 points**: 5 (five) (F)
- **51 to 60 points**: 6 (six) (E)
- **61 to 70 points**: 7 (seven) (D)
- **71 to 80 points**: 8 (eight) (C)
- **81 to 90 points**: 9 (nine) (B)
- **91 to 100 points**: 10 (ten) (A)

### 19. Signature requirement and passing the final exam

60% success from all pre-exam activities ie. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

### 20. Language of teaching / study

Macedonian

### 21. Method of monitoring the quality of teaching

Self-evaluation

### 22. Literature

#### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>2.</td>
<td>Zivanovik and Assistants</td>
<td>Lectures and exercises of mathematics 1</td>
<td>E-learning</td>
<td>2010</td>
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#### Additional literature

<table>
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<tr>
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<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tr>
<td>2.</td>
<td>Ivan Slapnicar</td>
<td>Matematika 1</td>
<td>Fakultet elektr. strojarstva i brodogradnje</td>
<td>2002, Split</td>
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</table>
**Annex No.3**

**Program of the Course - first cycle studies**

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
<td>Mechanical materials</td>
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<tr>
<td>2.</td>
<td>Code</td>
<td>2MF100112</td>
</tr>
<tr>
<td>3.</td>
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<td>Production engineering/Transport Organization and Logistics</td>
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<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering - Vinica</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
<td>First cycle</td>
</tr>
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<td>6.</td>
<td>Academic year / semester</td>
<td>First/I semester</td>
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<td>7.</td>
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<td>9.</td>
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</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies): At the end of the course, students will have competences obtained through the necessary fund of theoretical, methodological and applicative studying in the area of mechanical materials.</td>
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<td>11.</td>
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<tr>
<td></td>
<td>1.</td>
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<td>2.</td>
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<tr>
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<td>3.</td>
<td>Alloys and state diagram</td>
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<td>Steels: Obtaining and labelling</td>
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<td>5.</td>
<td>Carbon steels: structural and tool steels</td>
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<tr>
<td></td>
<td>6.</td>
<td>Alloy steel: structural and tool steels</td>
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<td></td>
<td>7.</td>
<td>Heat treatment of steels</td>
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<td>8.</td>
<td>Surface hardening of steels</td>
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<td></td>
<td>9.</td>
<td>Cast iron: gray iron and malleable iron</td>
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<tr>
<td></td>
<td>10.</td>
<td>Non ferrous metals and their alloys</td>
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<tr>
<td></td>
<td>11.</td>
<td>Ceramics, glass and composites</td>
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<tr>
<td></td>
<td>12.</td>
<td>Polymers and non metals (wood, leather, rubber)</td>
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<td>12.</td>
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<td>-</td>
<td>Teaching, exercises, projects assignment</td>
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<td>13.</td>
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<td>216</td>
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<td>14.</td>
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<td>3 + 2 + 2 / per week</td>
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<tr>
<td>15.</td>
<td>Forms of teaching / learning activities</td>
<td>15.1. lectures / theoretical - contact teaching, e-teaching</td>
</tr>
<tr>
<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<tr>
<td>16.</td>
<td>Other forms of activities</td>
<td>16.1. Project tasks</td>
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<tr>
<td>16.2. Individual tasks</td>
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<td>16.3. Home learning</td>
<td>/ hours</td>
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<td>17.</td>
<td>Method of assessment</td>
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<tr>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
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<tr>
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<td>Assessment Criteria (points / score)</td>
<td>up 50 points</td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
<td></td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
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</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
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</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
<td></td>
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<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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<td>19.</td>
<td>Signature requirement and passing the final exam</td>
<td>60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises</td>
</tr>
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<td>Language of teaching / study</td>
<td>Macedonian</td>
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<tr>
<td>21.</td>
<td>Method of monitoring the quality of teaching</td>
<td>Self-evaluation</td>
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| 22. | Literature |
| 22.1. Required literature | No. | Author | Title | Publisher | Year |
| 1. | Angel Tasevski, PhD Vladas Andonovic, MsC | Mechanical materials | UGD - Stip | 2011 |
| 2. | Angel Tasevski, PhD Vladas Andonovic, MsC | Mechanical materials estimation | UGD - Stip | 2011 |
| 3. | |

<p>| 22.2. Additional literature | No. | Author | Title | Publisher | Year |
| 1. | |
| 2. | |
| 3. | |</p>
<table>
<thead>
<tr>
<th>Annex No.3</th>
<th>Program of the Course - first cycle studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
</tr>
<tr>
<td>2.</td>
<td>Code</td>
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<tr>
<td>3.</td>
<td>Study program</td>
</tr>
<tr>
<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second, or third study cycle)</td>
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<td>6.</td>
<td>Academic year / semester</td>
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<td>7.</td>
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<tr>
<td>8.</td>
<td>Professor (s)</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
</tr>
<tr>
<td>11.</td>
<td>Contents of the course program:</td>
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<tr>
<td>12.</td>
<td>Learning methods:</td>
</tr>
<tr>
<td>13.</td>
<td>Total available time</td>
</tr>
<tr>
<td>14.</td>
<td>Distribution of available time</td>
</tr>
<tr>
<td>15.</td>
<td>Forms of teaching / learning activities</td>
</tr>
<tr>
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<tr>
<td>16.</td>
<td>Other forms of studying activities</td>
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<tr>
<td>17.</td>
<td>Method of assessment</td>
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<tr>
<td>18.</td>
<td>Assessment Criteria (points / score)</td>
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<tr>
<td>19.</td>
<td>Signature requirement and passing the final exam</td>
</tr>
<tr>
<td>20.</td>
<td>Language of teaching / study</td>
</tr>
<tr>
<td>21.</td>
<td>Method of monitoring the quality of teaching</td>
</tr>
</tbody>
</table>
Annex No.3

Program of the Course - first/second/third cycle studies

1. Title of the Course | Basics of Physics
2. Code | 2FP120512
3. Study Program | Production Engineering
4. Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev
| Faculty of mechanical engineering
5. Cycle (first, second and third cycle) | First cycle
6. Academic year / semester | 1/1
7. Number of credits | 4
8. Professor (s) | Prof. Todor Delipetrov, PhD
9. Requirements for enrollment the Course | enrolled semester
10. Purposes of the curriculum (competencies): Students are introduced to the basic concepts and laws of physics (Newton’s laws, Hooke’s law), elasticity and plasticity of bodies

---

22. Literature

### Required literature

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Zoran Zdravev and other</td>
<td>Computer Science script</td>
<td>UGD</td>
<td>2012</td>
</tr>
<tr>
<td>2.</td>
<td>Zoran Zdravev and other</td>
<td>Practicum in Computer Science</td>
<td>UGD</td>
<td>2012</td>
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</table>

### Additional Literature

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
</table>
12. **Learning methods:**
Lectures, exercises (numerical and practical), papers and home learning

13. **Total available time** 216 hours

14. **Distribution of available time** 2 + 1 + 1 / per week

15. **Forms of teaching / learning activities**

<table>
<thead>
<tr>
<th>No.</th>
<th>Lectures / theoretical - contact teaching, e-teaching</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.2</td>
<td>theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
<td>1</td>
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</table>

16. **Other forms of activities**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project tasks</th>
</tr>
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<tbody>
<tr>
<td>16.1</td>
<td>Project tasks</td>
</tr>
<tr>
<td>16.2</td>
<td>Individual tasks</td>
</tr>
<tr>
<td>16.3</td>
<td>Home learning</td>
</tr>
</tbody>
</table>

17. **Method of assessment**

<table>
<thead>
<tr>
<th>No.</th>
<th>Tests / oral exams</th>
<th>70 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.1</td>
<td>Tests / oral exams</td>
<td>70 points</td>
</tr>
<tr>
<td>17.2</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
<td>10 points</td>
</tr>
<tr>
<td>17.3</td>
<td>Activity and participation</td>
<td>20 points</td>
</tr>
</tbody>
</table>

18. **Assessment Criteria (points / score)**

<table>
<thead>
<tr>
<th>Points</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

19. **Signature requirement and passing the final exam**

60% success from all activities before exam i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. **Language of teaching / study** Macedonian

21. **Method of monitoring the quality of teaching** Self-evaluation

22. **Literature**

<table>
<thead>
<tr>
<th>Required literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>-----</td>
</tr>
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<td>22.1</td>
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<tr>
<td>22.2</td>
</tr>
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</table>

**Additional literature**

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lj. Petkovski</td>
<td>General physics</td>
<td>UKIM</td>
<td>1995</td>
</tr>
</tbody>
</table>
### Program of the Course - first/second/third cycle studies

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Title of the Course</strong></td>
<td>Physics 2</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Code</strong></td>
<td>2FP101212</td>
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<tr>
<td>3.</td>
<td><strong>Study Program</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 4. | **Organizer of the study program (unit or institute, Faculty, department)** | University Goce Delcev  
Faculty of mechanical engineering |
| 5. | **Cycle (first, second and third cycle)** | First cycle |
| 6. | **Academic year / semester** | 1/2 |
| 7. | **Number of credits** | 4 |
| 8. | **Professor (s)** | Prof. Todor Delipetrov, PhD |
| 9. | **Requirements for enrollment the Course** | Student has enrolled current year |
| 10. | **Purposes of the curriculum (competencies):** | Students are introduced to the basic concepts and laws of electromagnetism, optics, nuclear and atomic physics |
| 11. | **Content of the course program:** | Heat: temperature, spread of bodies, state of gas, melting, boiling, vaporization.  
Electrostatics: Coulomb’s law, electrical work and power of the electric current, Joule’s Law, Ohm’s law, thermal phenomena, magnetic permeability and susceptibility. AC: effective value of alternating current, power of alternating current, electrical oscillations. Geometrical optics: light rejection and image in the flat mirror, thin lens equation, optical instruments. Physical optics: nature of light, laser, optical lattice. Atomic and nuclear physics: spectrum of hydrogen atom, quantum theory, radioactive radiation, detectors and protection, radioactive decay law |
<p>| 12. | <strong>Learning methods:</strong> | Lectures, exercises (numerical and practical), papers and home learning |
| 13. | <strong>Total available time</strong> | 156 hours |
| 14. | <strong>Distribution of available time</strong> | 2 + 2 + 1 / per week |
| 15. | <strong>Forms of teaching / learning activities</strong> | 15.1. lectures / theoretical contact teaching, e-teaching |
|  |  | 15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work |
| 16. | <strong>Other forms of activities</strong> | 16.1. Project tasks |</p>
<table>
<thead>
<tr>
<th></th>
<th>16.2.</th>
<th>Individual tasks</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16.3.</td>
<td>Home learning</td>
<td></td>
</tr>
</tbody>
</table>

17. Method of assessment

17.1. Tests / oral exams  70 points

17.2. Seminars (paper / project - presentation: written and/or oral)  10 points

17.3. Activity and participation  20 points

18. Assessment Criteria (points / score)

- up 50 points  5 (five) (F)
- 51 to 60 points  6 (six) (E)
- 61 to 70 points  7 (seven) (D)
- 71 to 80 points  8 (eight) (C)
- 81 to 90 points  9 (nine) (B)
- 91 to 100 points  10 (ten) (A)

19. Signature requirement and passing the final exam

60% success from all activities before exam i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. Language of teaching / study

Macedonian

21. Method of monitoring the quality of teaching

Self-evaluation

22. Literature

<table>
<thead>
<tr>
<th></th>
<th>Required literature</th>
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<tr>
<td>22.1.</td>
<td>1.</td>
<td>M. Delipetrev B. Doneva</td>
<td>Physics 2</td>
<td>UGD</td>
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<table>
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<tr>
<td>22.2.</td>
<td>1.</td>
<td>Z. Stojanov</td>
<td>General physics, book 2</td>
<td>UKIM</td>
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</table>

Annex No.3 Program of the course–first cycle studies

<table>
<thead>
<tr>
<th></th>
<th>Title of the Course</th>
<th>Electrotechnics and Electronics</th>
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<tbody>
<tr>
<td>1.</td>
<td>Code</td>
<td>2ETI10012</td>
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<tr>
<td>2.</td>
<td>Study program</td>
<td>Production Engineering / Transport, Organization and Logistics</td>
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<tr>
<td></td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering -Vinica</td>
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<td>5.</td>
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<td>Academic year / semester</td>
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<td>Professor (s)</td>
<td>Roman Golubovski, Assistant Professor</td>
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<td>9.</td>
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<td>enrolled 1st semester</td>
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<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
<td>Introduction to basic principles of electrotechnics and electronics.</td>
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<td>Contents of the course program:</td>
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<tr>
<td></td>
<td>1. Electric Current - Intensity, Current Field, Density</td>
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<tr>
<td></td>
<td>2. Electric Voltage and Potential</td>
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<td></td>
<td>3. Basic Laws - Joule's, Ohm's, I &amp; II Kirchhoff's</td>
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<tr>
<td></td>
<td>4. Magnetic Flux, Magnetic Field and Magnetism</td>
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<td>5. Magnetic Induction, Ampere's Law and Magnetic Circuit</td>
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<td>6. Electrical Measurements</td>
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<td>7. Semiconductors</td>
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<td>8. Diodes</td>
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<td>9. BJT Transistors</td>
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<td>10. MOSFET Transistors</td>
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<td>11. Thyristors</td>
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<td>12. Operational Amplifiers</td>
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<tr>
<td>12.</td>
<td>Learning methods:</td>
<td>Lectures, numerical exercises, individual and team projects, homework.</td>
</tr>
<tr>
<td>13.</td>
<td>Total available time</td>
<td>120</td>
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<tr>
<td>14.</td>
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<td>15.</td>
<td>Forms of teaching / learning activities</td>
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<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<tr>
<td>16.</td>
<td>Other forms of studying activities</td>
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</tr>
<tr>
<td></td>
<td>16.1. Project tasks</td>
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<td>16.2. Individual tasks</td>
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<td></td>
<td>16.3. Home learning</td>
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<tr>
<td>17. Method of assessment</td>
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<td></td>
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<tr>
<td>-----------------------------------------------</td>
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</tr>
<tr>
<td>17.1. Tests / oral exams</td>
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<tr>
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<tr>
<td>17.3. Activity and participation</td>
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<table>
<thead>
<tr>
<th>18. Assessment Criteria (points / score)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Up 50 points</td>
<td>5 (five) (F)</td>
<td></td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
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<td>10 (ten) (A)</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>19. Signature requirement and passing the final exam</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>20. Language of teaching / study</th>
<th>Macedonian</th>
<th></th>
</tr>
</thead>
</table>

| 21. Method of monitoring the quality of teaching | Self-evaluation | |

<table>
<thead>
<tr>
<th>22. Literature</th>
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<tbody>
<tr>
<td>22.1. Required literature</td>
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<td></td>
</tr>
<tr>
<td>Orde r No.</td>
<td>Author</td>
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</tr>
<tr>
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<tr>
<td>1.</td>
<td>M. Popnikolova-Radevska</td>
<td>Electrotechnics</td>
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<td>2.</td>
<td>M. Kamilovski</td>
<td>Electronics 1</td>
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<p>| 22.2 Additional Literature                          |  | |</p>
<table>
<thead>
<tr>
<th>Orde r No.</th>
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<th>Title</th>
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<th>Year</th>
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</table>

<table>
<thead>
<tr>
<th>Annex No.3 Program of the Course - first cycle studies</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Title of the Course</td>
<td>Casting technology</td>
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<tr>
<td>2. Code</td>
<td>2MF101812</td>
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</tr>
<tr>
<td>3. Study Program</td>
<td>Production engineering/ Transport Organization and Logistics</td>
<td></td>
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<tr>
<td>4. Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering -Vinica</td>
<td></td>
</tr>
<tr>
<td>5. Cycle (first, second and third cycle)</td>
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<td></td>
</tr>
<tr>
<td>6. Academic year / semester</td>
<td>First / I semester</td>
<td>7. Number of credits</td>
</tr>
</tbody>
</table>
### 8. Professor (s)
Slavco Cvetkov, PhD, Assistant Professor

### 9. Requirements for enrollment the Course
No

### 10. Purposes of the curriculum (competencies): At the end of the course, students will have competences obtained through the necessary fund of theoretical, methodological and applicative studying in the area of casting technology.

### 11. Content of the course program:
- 1. Introduction to the casting
- 2. Casting materials
- 3. Casting metallurgy
- 4. Sand casting
- 5. Centrifugal casting
- 6. Precise casting
- 7. Vacuum casting
- 8. Casting under pressure
- 9. Heaters for melting
- 10. Tools for casting
- 11. Construction tools for casting
- 12. Defects in casting

### 12. Learning methods:
- Teaching, exercises, projects assignment

### 13. Total available time
120

### 14. Distribution of available time
2 + 1 + 1 / per week

### 15. Forms of teaching / learning activities

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>15.1. lectures / theoretical - contact teaching, e-teaching</td>
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<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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### 16. Other forms of activities

<p>| | |</p>
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<tbody>
<tr>
<td></td>
<td>16.1. Project tasks / hours</td>
</tr>
<tr>
<td></td>
<td>16.2. Individual tasks 1 hours</td>
</tr>
<tr>
<td></td>
<td>16.3. Home learning / hours</td>
</tr>
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</table>

### 17. Method of assessment

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>17.1. Tests / oral exams 70 points</td>
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<tr>
<td></td>
<td>17.2. Seminars (paper / project - presentation: written and/or oral) 10 points</td>
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<tr>
<td></td>
<td>17.3. Activity and participation 20 points</td>
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### 18. Assessment Criteria (points / score)

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>
19. **Signature requirement and passing the final exam**  
60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. **Language of teaching / study**  
Macedonian

21. **Method of monitoring the quality of teaching**  
Self-evaluation

### Annex No.3

#### Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th></th>
<th>Title of the Course</th>
<th>Mathematics II</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>Code</td>
<td>2FI100412</td>
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<table>
<thead>
<tr>
<th></th>
<th>Study Program</th>
<th>Production Engineering / Transport, Organization and Logistics</th>
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<tbody>
<tr>
<td></td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering -Vinica</td>
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<table>
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<tr>
<th></th>
<th>Cycle (first, second and third cycle)</th>
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<th></th>
<th>Academic year / semester</th>
<th>First/II</th>
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<table>
<thead>
<tr>
<th></th>
<th>Professor (s)</th>
<th>Prof. Martin Lukarevski PhD / Prof. Jordan ZivanovikPhD</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Requirements for enrollment the Course</th>
<th>Enrollment of the first cycle study program</th>
</tr>
</thead>
</table>

#### Purposes of the curriculum (competencies):
Knowledge and understanding of the basic mathematical concepts and theories, knowledge of ICT in mathematics, flexible use of knowledge in practice.

#### Content of the course program:
13. The concept of Integral Calculus: Indefinite integral – integration by substitution and integration by parts, fundamental integration formulas, Definite integral-concept, properties and applications.


15. Multivariate Calculus: definition, properties and graphics of functions with several variables; Partial derivatives; Maximum and minimum values; The total differential.

16. Multiple integrals.

17. Introduction of differential equations: Terminology and notation; A first-order differential equation for the exponential function; First-order linear differential equations and other types of first-order differential equations.

12. Learning methods:
   - Lectures,
   - e-learning,
   - individual and team projects
   - Consultations.

13. Total available time 216

14. Distribution of available time 3+2+2 / per week

15. Forms of teaching / learning activities
   15.1. lectures / theoretical - contact teaching, e-teaching 3
   15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work 2

16. Other forms of activities
   16.1. Project tasks 1 hours
   16.2. Individual tasks 1 hours
   16.3. Home learning hours

17. Method of assessment
   17.1. Tests / oral exams 70 points
   17.2. Seminars (paper / project - presentation: written and/or oral) 10 points
   17.3. Activity and participation 20 points

18. Assessment Criteria (points / score) up 50 points 5 (five) (F)
   51 to 60 points 6 (six) (E)
   61 to 70 points 7 (seven) (D)
<table>
<thead>
<tr>
<th>Points Range</th>
<th>Grade</th>
<th>Letter</th>
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<tbody>
<tr>
<td>71 to 80 points</td>
<td>8</td>
<td>(C)</td>
</tr>
<tr>
<td>81 to 90 points</td>
<td>9</td>
<td>(B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10</td>
<td>(A)</td>
</tr>
</tbody>
</table>

19. Signature requirement and passing the final exam
   - 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. Language of teaching / study
   - Macedonian

21. Method of monitoring the quality of teaching
   - Self-evaluation

### Annex No.3 Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Engineering graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Code</td>
<td>2FP100912</td>
</tr>
<tr>
<td>3</td>
<td>Study Program</td>
<td>Production Engineering /Transport, Organization and Logistics</td>
</tr>
<tr>
<td>4</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering - Vinica</td>
</tr>
<tr>
<td>5</td>
<td>Cycle (first, second and third cycle)</td>
<td>First cycle</td>
</tr>
<tr>
<td>6</td>
<td>Academic year / semester</td>
<td>First / second semester</td>
</tr>
</tbody>
</table>

### Literature

#### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>3.</td>
<td>Tatjana Atanasova Pacemska</td>
<td>Matematika 2</td>
<td>Avtorizirani predavanja</td>
<td>2011</td>
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</table>

#### Additional literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Nikita Sekutkovski</td>
<td>Matematicka analiza 1</td>
<td>Prosvetno delo - Skopje</td>
<td>2008</td>
</tr>
<tr>
<td>2.</td>
<td>Boro Piperevski</td>
<td>Matematika 2</td>
<td>FEIT - Skopje</td>
<td>2008</td>
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<td></td>
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</tr>
<tr>
<td>8.</td>
<td><strong>Professor(s)</strong></td>
<td>Assi. Prof. Slavco Cvetkov, Ph.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td><strong>Requirements for enrollment the Course</strong></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td><strong>Purposes of the curriculum (competencies):</strong></td>
<td>Training in drawing and reading technical drawings of machine parts. Training in drawing machine parts in the program package Auto CAD.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td><strong>Learning methods:</strong></td>
<td>Lectures, exercises, individual works, home learning, consultations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td><strong>Total available time</strong></td>
<td>156 hours</td>
<td></td>
<td></td>
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<td>14.</td>
<td><strong>Distribution of available time</strong></td>
<td>2+2+1 / per week</td>
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<td></td>
</tr>
<tr>
<td>15.</td>
<td><strong>Forms of teaching / learning activities</strong></td>
<td>15.1. lectures / theoretical - contact teaching, e-teaching 2 hours 15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work 2 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td><strong>Method of assessment</strong></td>
<td>17.1. Tests / oral exams 70 points 17.2. Seminars (paper / project - presentation: written and/or oral) 10 points 17.3. Activity and participation 20 points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td><strong>Assessment Criteria (points / score)</strong></td>
<td>up 50 points 5(five) (F) 51 to 60 points 6(six) (E) 61 to 70 points 7 (seven) (D) 71 to 80 points 8 (eight) (C) 81 to 90 points 9 (nine) (B) 91 to 100 points 10 (ten) (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td><strong>Signature requirement and passing the final exam</strong></td>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
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</table>
## Language of teaching / study
Macedonian

## Method of monitoring the quality of teaching
Self-evaluation

<table>
<thead>
<tr>
<th>22. Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required literature</strong></td>
</tr>
<tr>
<td>No.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

| 22.2. Additional literature |
| No. | Author | Title | Publisher | Year |
| 1. |  |  |  |  |
| 2. |  |  |  |  |
| 3. |  |  |  |  |

<table>
<thead>
<tr>
<th>Annex No.3</th>
<th>Program of the Course - first cycle studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
</tr>
<tr>
<td>2.</td>
<td>Code</td>
</tr>
<tr>
<td>3.</td>
<td>Study Program</td>
</tr>
<tr>
<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
</tr>
<tr>
<td>6.</td>
<td>Academic year / semester</td>
</tr>
<tr>
<td>7.</td>
<td>Number of credits</td>
</tr>
<tr>
<td>8.</td>
<td>Professor (s)</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies): Students are introduced to statics: forces, moments, carriers, equilibrium of bodies, friction, centre of gravity;</td>
</tr>
<tr>
<td>11.</td>
<td>Content of the course program:</td>
</tr>
<tr>
<td>1.</td>
<td>System of forces acting in the plane, composition and decomposition of forces acting at a point;</td>
</tr>
<tr>
<td>2.</td>
<td>Moment of force about a point, Varignon’s theorem;</td>
</tr>
<tr>
<td>3.</td>
<td>System of forces attacking panel and various counts;</td>
</tr>
<tr>
<td>4.</td>
<td>Graphic alignment of forces, equilibrium of forces;</td>
</tr>
<tr>
<td>5.</td>
<td>Planar carriers, transverse and axial forces;</td>
</tr>
<tr>
<td>6.</td>
<td>Simple beam loaded with concentrated forces;</td>
</tr>
<tr>
<td>7.</td>
<td>Simple beam loaded with a continuous load, coupling forces; Console;</td>
</tr>
<tr>
<td>8.</td>
<td>Beam with overhangs; Gerber carrier-beam;</td>
</tr>
<tr>
<td>9.</td>
<td>Statically determined framework supports; Lattice girders;</td>
</tr>
</tbody>
</table>
10. Statics in space; Spatial carriers;  
11. Sliding friction, rolling friction, friction of the rope;  
12. Centre of gravity line, surface and body; Guldin’s theorems;  

12. **Learning methods:**  
Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.  

13. **Total available time**  
156 hours  

14. **Distribution of available time**  
2 + 2 + 1/ per week  

15. **Forms of teaching / learning activities**  
15.1. **lectures / theoretical - contact teaching,** e-teaching  
15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work  

2 hours  

16. **Other forms of activities**  
16.1. **Project tasks**  
16.2. **Individual tasks** 1 hour  
16.3. **Home learning**  

17. **Method of assessment**  
17.1. **Tests / oral exams** 70  
17.2. **Seminars (paper / project - presentation: written and/or oral)** 10  
17.3. **Activity and participation** 20  

18. **Assessment Criteria (points / score)**  
to 50 points 5(five) (F)  
from 51 to 60 points 6(six) (E)  
from 61 to 70 points 7 (seven) (D)  
from 71 to 80 points 8 (eight) (C)  
from 81 to 90 points 9 (nine) (B)  
from 91 to 100 points 10 (ten) (A)  

19. **Signature requirement and passing the final exam**  
60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions  

20. **Language of teaching / study**  
Macedonian  

21. **Method of monitoring the quality of teaching**  
Self-evaluation  

22. **Literature**  

<table>
<thead>
<tr>
<th>Required literature</th>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>22.1.</td>
<td>1.</td>
<td>Simeon Simeonov</td>
<td>Technical mechanics 1(peer reviewed script)</td>
<td>UGD-Stip</td>
<td>2012</td>
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<tr>
<td>2.</td>
<td>Z.Petreveksi, V. Gavrilovski, M. Mickovski</td>
<td>Tasks from Statics</td>
<td>Mechanical faculty Skopje</td>
<td>2008</td>
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</table>

22.2. **Additional literature**
### Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>B. Andonovic</td>
<td>Technical mechanics 1</td>
<td>Technical Faculty- Bitola</td>
<td>2006</td>
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<tr>
<td>2.</td>
<td>E. Bahtovska</td>
<td>Mechanics</td>
<td>Technical Faculty- Bitola</td>
<td>2007</td>
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**1. Title of the Course**: The modern mechanical materials

**2. Code**: 2MF101912

**3. Study Program**: Production engineering/Transport Organization and Logistics

**4. Organizer of the study program (unit or institute, Faculty, department)**: University Goce Delcev-Stip Faculty of mechanical engineering - Vinica

**5. Cycle (first, second and third cycle)**: First cycle

**6. Academic year / semester**: First/I semester

**7. Number of credits**: 4

**8. Professor (s)**: Slavco Cvetkov, PhD, Assi. Professor

**9. Requirements for enrollment the Course**: No

**10. Purposes of the curriculum (competencies)**: At the end of the course, students will have competences obtained through the necessary fund of theoretical, methodological and applicative studying in the area of the mechanical materials.

**11. Content of the course program:**

1. Introduction to the newest materials
2. The modern engineering materials
3. Composites
4. Introduction to fullerenes
5. Biomaterials and their usage
6. Polymers
7. Smart materials
8. Cellular materials  
9. Nanomaterials  
10. Ceramics  
11. Wood, paper and glues  
12. The procedure of material selection

12. **Learning methods:**  
   - Teaching, exercises, projects assignment

<table>
<thead>
<tr>
<th>13. Total available time</th>
<th>120</th>
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</thead>
<tbody>
<tr>
<td>14. Distribution of available time</td>
<td>2 + 1 + 1 / per week</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>15. Forms of teaching / learning activities</th>
<th>15.1. lectures / theoretical - contact teaching, e-teaching</th>
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<tbody>
<tr>
<td></td>
<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<table>
<thead>
<tr>
<th>16. Other forms of activities</th>
<th>16.1. Project tasks</th>
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<tbody>
<tr>
<td></td>
<td>16.2. Individual tasks</td>
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<tr>
<td></td>
<td>16.3. Home learning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>17. Method of assessment</th>
<th>17.1. Tests / oral exams</th>
<th>70 points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
<td>10 points</td>
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<tr>
<td></td>
<td>17.3. Activity and participation</td>
<td>20 points</td>
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</table>

<table>
<thead>
<tr>
<th>18. Assessment Criteria (points / score)</th>
<th>up 50 points</th>
<th>5 (five) (F)</th>
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<tbody>
<tr>
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</tr>
<tr>
<td></td>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
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<tr>
<td></td>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
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<tr>
<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
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<tr>
<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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<tr>
<th>19. Signature requirement and passing the final exam</th>
<th>60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises</th>
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</thead>
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<table>
<thead>
<tr>
<th>20. Language of teaching / study</th>
<th>Macedonian</th>
</tr>
</thead>
</table>

| 21. Method of monitoring the quality of teaching | Self-evaluation |

| 22. Literature | |
## Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Engineering logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2MF106712</td>
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<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production engineering/Transport, organization and logistics</td>
</tr>
<tr>
<td>4.</td>
<td>Organizer of the study program(unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering - Vinica</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
<td>First cycle studies (Bachelor studies)</td>
</tr>
<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>First/Second semester</td>
</tr>
<tr>
<td>8.</td>
<td>Professor (s)</td>
<td>Prof. Zoran Despodov</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
<td>No</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum(competencies):</td>
<td>Familiarize students with the fundamentals of Engineering logistics, practical application and ways of making a better use of the resources</td>
</tr>
</tbody>
</table>

### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Angel Tasevski, PhD; Vladan Andonovic, MsC</td>
<td>The modern mechanical materials</td>
<td>UGD - Stip</td>
<td>2011</td>
</tr>
<tr>
<td>2.</td>
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### Additional literature

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11. **Content of the course program:**
   

12. **Learning methods:**
   
   - Theory, practical teaching and auditory exercises

13. **Total available time**
   
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14. **Distribution of available time**
   
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15. **Forms of teaching / learning activities**
   
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16. **Other forms of activities**
   
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17. **Method of assessment**
   
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<th>70 points</th>
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<td>17.1.</td>
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<td>17.2.</td>
<td>Seminars (paper/project - presentation: written and/or oral)</td>
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<tr>
<td>17.3.</td>
<td>Activity and participation</td>
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18. **Assessment Criteria (points / score)**
   
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<th></th>
<th>up 50 points</th>
<th>5 (five) (F)</th>
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<tr>
<td></td>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
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<td></td>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
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<td></td>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
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<tr>
<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
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<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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### Required literature

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<tr>
<td>1</td>
<td>T. Pantelic</td>
<td>Industrial logistics</td>
<td>ICIM, Krusevac</td>
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<td>V. Jocik</td>
<td>Technical logistics</td>
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### Additional literature

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#### Annex No.3

**Program of the Course - first cycle studies**

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<th>Thermodynamics</th>
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<td>Code</td>
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<tr>
<td>3</td>
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<td>Production engineering / Transport, organization and logistics</td>
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<td>8</td>
<td>Professor (s)</td>
<td>Assistant Prof. Radomir Cvetanovski, PhD</td>
</tr>
<tr>
<td>9</td>
<td>Requirements for enrollment the Course</td>
<td>non</td>
</tr>
<tr>
<td>10</td>
<td>Purposes of the curriculum (competencies):</td>
<td>Introducing the values of condition and their changes, the basic gas laws, equation of condition of ideal gases, internal energy, entropy, heat diagram; humid air</td>
</tr>
</tbody>
</table>
### Content of the course program:

1. Introductory terms and values of condition; Basic gas laws; Concept of ideal gas and equation of condition of an ideal gas; The main laws of thermodynamics; Specific heat capacity; Changes of condition of ideal gases;
2. Circular process; Recoverable and irreversible processes; Entropy; Double phased fixtures; Real gases; Humid air;

### Learning methods:
Lectures with presentations through slides, exercises, independent preparation and presentation of the project assignment.

### Total available time
216

### Distribution of available time
3+2+2 / per week

### Forms of teaching / learning activities

| 15.1. | lectures / theoretical - contact teaching, e-teaching | 3 |
| 15.2. | theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 |

### Other forms of activities

| 16.1. | Project tasks | 1 hours |
| 16.2. | Individual tasks | 1 hours |
| 16.3. | Home learning | hours |

### Method of assessment

| 17.1. | Tests / oral exams | 70 points |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. | Activity and participation | 20 points |

### Assessment Criteria (points / score)

| up 50 points | 5(five) (F) |
| 51 to 60 points | 6(six) (E) |
| 61 to 70 points | 7 (seven) (D) |
| 71 to 80 points | 8 (eight) (C) |
| 81 to 90 points | 9 (nine) (B) |
| 91 to 100 points | 10 (ten) (A) |

### Signature requirement and passing the final exam

60% from pre-exam activities or 42 points from the two tests, seminar papers, attendance of lectures and exercises.

### Language of teaching / study
Macedonian

### Method of monitoring the quality of teaching
Self-evaluation

### Literature

<table>
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16. **Other forms of activities**

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<tr>
<td>16.2</td>
<td>Individual tasks</td>
<td>1 hour</td>
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<td>16.3</td>
<td>Home learning</td>
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17. **Method of assessment**

<table>
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<th>Percentage</th>
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<td>17.2 Seminars (paper / project - presentation: written and/or oral)</td>
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<tr>
<td>17.3 Activity and participation</td>
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18. **Assessment Criteria (points / score)**

- to 50 points: 5 (five) (F)
- from 51 to 60 points: 6 (six) (E)
- from 61 to 70 points: 7 (seven) (D)
- from 71 to 80 points: 8 (eight) (C)
- from 81 to 90 points: 9 (nine) (B)
- from 91 to 100 points: 10 (ten) (A)

19. **Signature requirement and passing the final exam**

- 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**

- Macedonian

21. **Method of monitoring the quality of teaching**

- Self-evaluation

22. **Literature**

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<td>22.1</td>
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<td>K.Angjusev, D.Korunovski, Z.Petreski,G.Tasevski</td>
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<td>Students are introduced to the movement of bodies, kinematics, dynamics and oscillations</td>
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<td>Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.</td>
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<td>16.3.</td>
<td>Home learning</td>
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### Method of assessment

17.1. Tests / oral exams

17.2. Seminars (paper / project - presentation: written and/or oral)

17.3. Activity and participation

### Assessment Criteria (points / score)

- to 50 points: 5 (five) (F)
- from 51 to 60 points: 6 (six) (E)
- from 61 to 70 points: 7 (seven) (D)
- from 71 to 80 points: 8 (eight) (C)
- from 81 to 90 points: 9 (nine) (B)
- from 91 to 100 points: 10 (ten) (A)

### Signature requirement and passing the final exam

- 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

### Language of teaching / study

- Macedonian

### Method of monitoring the quality of teaching

- Self-evaluation

### Literature

#### Required literature

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<td>Kinematics, dynamics, oscillations</td>
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<td>B. Andonovic</td>
<td>Technical mechanics 1 collection of solved problems</td>
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<td>S. Guric</td>
<td>Dynamics and theory of oscillation</td>
<td>Mechanical faculty-beograd</td>
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<td>3</td>
<td>I. Mickovski</td>
<td>Mechanisms and oscillations</td>
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### Annex No.3

#### Program of the Course - first cycle studies

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<td>University Goce Delcev-Stip Faculty of mechanical engineering - Vinica</td>
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<td><strong>Professor (s)</strong></td>
<td>Assi. Professor Slavco Cvetkov, PhD</td>
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<td>5. Corrosion under mechanical factors</td>
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<td>6. Procedures for metals protection</td>
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<td>7. Protection with electrode potential</td>
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<td>9. Protection with surface coating</td>
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<td>11. Coating metals protection</td>
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### Other forms of activities

16. **Project tasks**

16.2. **Individual tasks**  
1 hour

16.3. **Home learning**

### Method of assessment

17.1. **Tests / oral exams**  
70 points

17.2. **Seminars (paper / project - presentation: written and/or oral)**  
10 points

17.3. **Activity and participation**  
20 points

### Assessment Criteria (points / score)

- **up 50 points**  
  5 (five) (F)

- **51 to 60 points**  
  6 (six) (E)

- **61 to 70 points**  
  7 (seven) (D)

- **71 to 80 points**  
  8 (eight) (C)

- **81 to 90 points**  
  9 (nine) (B)

- **91 to 100 points**  
  10 (ten) (A)

### Signature requirement and passing the final exam

60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

### Language of teaching / study

Macedonian

### Method of monitoring the quality of teaching

Self-evaluation

### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
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<td>1.</td>
<td>H.J. Svetomir</td>
<td>Corrosion and protection</td>
<td>Skopje - TMF</td>
<td>1989</td>
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<td>2.</td>
<td>M. Milenkovic</td>
<td>Corrosion and protection</td>
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### Annex No.3

**Program of the Course - first cycle studies**

1. **Title of the Course**  
Probability and statistics
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17. **Method of assessment**

17.1. Tests / oral exams  70 points

17.2. Seminars (paper / project - presentation: written and/or oral)  10 points

17.3. Activity and participation  20 points

18. **Assessment Criteria (points / score)**

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<td>61 to 70 points</td>
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<td>71 to 80 points</td>
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19. **Signature requirement and passing the final exam**

- 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**

- Macedonian

21. **Method of monitoring the quality of teaching**

- Self-evaluation

### Literature

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<td>Risto Malceski</td>
<td>Voved vo teorijata na verojatnosta</td>
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<td>Željko Pauše</td>
<td>Uvod u matematičku statistiku</td>
<td>Školska knjiga, Zagreb</td>
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### Annex No.3

**Program of the Course - first/second/third cycle studies**

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<td>V. Bulat</td>
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**Annex No.3 | Program of the Course - first cycle studies**

1. Title of the Course | Machine elements
2. Code | 2MF100712
3. Study Program | Production Engineering /Transport, Organization and Logistics
4. Organizer of the study program (unit or institute, Faculty, department) | University “Goce Delcev”- Stip. Faculty of Mechanical Engineering -Vinica
5. Cycle (first, second and third cycle) | First cycle
6. Academic year / semester | second / fourth
7. Number of credits | 8
8. Professor (s) | Assi. Prof. Ph.D Simeon Simeonov
9. Requirements for enrollment the Course | Attended course of Strength of material
10. Purposes of the curriculum (competencies): Students are introduced to the properties of machine elements, their dimensioning and constructing;
11. Content of the course program: Elements for joining. Separable threaded fasteners, types, threaded transmitters, threaded fasteners, material, calculation; Wedges, serrated joints, pins. Inseparable fasteners (rivets, welded connections); Springs, flexible springs, spirally screw springs, construction and calculation; Bearing, ball bearing (rolling bearings), sleeve bearing (slide bearings), construction and calculation; Clutches, constantly engaged, engaged-disengaged manageable clutches, automatic clutches. Installation of pipes; Gears, cylindrical gears, construction and calculation. Conical gears, construction and calculation; Worm and gear sets; Belts transmitters; Friction transmitters; Chains.
12. Learning methods: Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.
13. Total available time | 216 hours
14. Distribution of available time | 3 +2 +2/ per week
15. Forms of teaching / learning activities | 15.1. lectures / theoretical - contact teaching, e-teaching | 3 hours
<p>| 15.2. | theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 hours |
| 16. | Other forms of activities | 16.1. | Project tasks | 1 hour |
| | | 16.2. | Individual tasks | 1 hour |
| | | 16.3. | Home learning |
| 17. | Method of assessment | 17.1. | Tests / oral exams | 70 |
| | | 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 |
| | | 17.3. | Activity and participation | 20 |
| 18. | Assessment Criteria (points / score) | to 50 points | 5 (five) (F) |
| | | from 51 to 60 points | 6 (six) (E) |
| | | from 61 to 70 points | 7 (seven) (D) |
| | | from 71 to 80 points | 8 (eight) (C) |
| | | from 81 to 90 points | 9 (nine) (B) |
| | | from 91 to 100 points | 10 (ten) (A) |
| 19. | Signature requirement and passing the final exam | 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions |
| 20. | Language of teaching / study | Macedonian |
| 21. | Method of monitoring the quality of teaching | Self-evaluation |
| 22. | Literature | 22.1. | Required literature | |
| | | No. | Author | Title | Publisher | Year |
| | | 1. | Simeon Simeonov | Strength of material (script) | UGD-Stip | 2011 |
| | | 2. | D.Stamboliev | Machine elements | UKIM Skopje | 1975 |
| | | 3. | K.Trimcevski | Machine elements | Mechanical faculty - Skopje |
| | | 22.2. | Additional literature | |
| | | No. | Author | Title | Publisher | Year |
| | | 1. | M. Ognjanovik | Mechanical elements | Mechanical faculty - Beograd | 2008 |
| | | 2. | S.Simeonov | Mechanical elements-collection tasks | UGD-Stip | 2011 |
| | | 3. | | | |</p>
<table>
<thead>
<tr>
<th>Annex No.3</th>
<th>Program of the Course - first cycle studies</th>
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<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
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<tr>
<td>2.</td>
<td>Code</td>
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<td>3.</td>
<td>Study Program</td>
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<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
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<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
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<td>6.</td>
<td>Academic year / semester</td>
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<td>7.</td>
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<td>8.</td>
<td>Professor (s)</td>
</tr>
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<td>Requirements for enrollment the Course</td>
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<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
</tr>
<tr>
<td>11.</td>
<td>Content of the course program:</td>
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<tr>
<td>12.</td>
<td>Learning methods:</td>
</tr>
<tr>
<td>13.</td>
<td>Total available time</td>
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<td>14.</td>
<td>Distribution of available time</td>
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<td>15.</td>
<td>Forms of teaching / learning activities</td>
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17. **Method of assessment**

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<tr>
<th>17.1.</th>
<th>Tests / oral exams</th>
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<tr>
<td>17.2.</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
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<td>17.3.</td>
<td>Activity and participation</td>
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18. **Assessment Criteria (points / score)**

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<th>Points</th>
<th>Score</th>
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<tr>
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<tr>
<td>51 to 60 points</td>
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<td>7 (seven) (D)</td>
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<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
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<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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</table>

19. **Signature requirement and passing the final exam**

60% of pre-exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. **Language of teaching / study**

Macedonian language

21. **Method of monitoring the quality of teaching**

Self-evaluation

22. **Literature**

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</table>
19. **Signature requirement and passing the final exam**
   - 81 to 90 points: 9 (nine) (B)
   - 91 to 100 points: 10 (ten) (A)
   - 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**
   - Macedonian

21. **Method of monitoring the quality of teaching**
   - Self-evaluation

---

### Literature

#### Required literature

<table>
<thead>
<tr>
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<th>Author</th>
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<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Blagoj Golomeov</td>
<td>Numerical methods in mining and geology</td>
<td>Faculty of Natural and Technical Sciences</td>
<td>2009</td>
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#### Additional literature

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### Annex No.3

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Measurement and measuring instruments</th>
<th>Code</th>
<th>2MF102212</th>
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</thead>
<tbody>
<tr>
<td>3.</td>
<td>Study Program:</td>
<td>Production Engineering / Transport, Organization and Logistics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering -Vinica</td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td>Cycle (first, second, third cycle)</td>
<td>First cycle</td>
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<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>Second / fourth semester</td>
<td>7.</td>
<td>Number of ECTS credits</td>
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<tr>
<td>8.</td>
<td>Professor (s)</td>
<td>Assi. Prof. Bratica Temelkoska, Ph.D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrolment the Course</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies): Students are introduced to the types of measuring instruments and their application</td>
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<tr>
<td>11.</td>
<td>Content of the course program: Basic and general terms in metrology: Measurement and measurement concept,</td>
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</tr>
</tbody>
</table>
defined in terms of metrology; Measuring instruments; caliper rule and micrometers; comparators; yardsticks for measuring angles and cones; Methods for measurement and control coils; measuring machines; Measuring instruments based on optical measurements; pressure measurement. Temperature measurement; Instruments for measuring flow; Measuring force. Instruments for measuring deformations.

12. **Learning methods;**
Theoretical lectures, laboratory exercises

13. **Total available time** | 120 hours

14. **Distribution of the available time** | 2+1+1

15. **Forms of teaching/ Learning activities**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>15.1</td>
<td>Lectures - theoretical contact teaching/e-teaching</td>
<td>2</td>
</tr>
<tr>
<td>15.2</td>
<td>Theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
<td>1</td>
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</table>

16. **Other forms of activities**

<p>| | |</p>
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<thead>
<tr>
<th></th>
<th></th>
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<td>16.1</td>
<td>Projects tasks</td>
</tr>
<tr>
<td>16.2</td>
<td>Individual tasks</td>
</tr>
<tr>
<td>16.3</td>
<td>Home learning</td>
</tr>
</tbody>
</table>

17. **Method of assessment**

<p>| | |</p>
<table>
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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>17.1.</td>
<td>Tests / oral exams,</td>
</tr>
<tr>
<td>17.2.</td>
<td>Seminars (paper/project - presentation ; written and/or oral</td>
</tr>
<tr>
<td>17.3.</td>
<td>Activity and participacion</td>
</tr>
</tbody>
</table>

18. **Assessment Criteria (points / score)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>from to 50 points</td>
<td>5( five) (F)</td>
</tr>
<tr>
<td>from 51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td>from 61 to 70 points</td>
<td>7(seven) (D)</td>
</tr>
<tr>
<td>from 71 to 80 points</td>
<td>8(eight) (C)</td>
</tr>
<tr>
<td>from 81 to 90 points</td>
<td>9(nine) (B)</td>
</tr>
<tr>
<td>from 91 to 100 points</td>
<td>10(ten) (A)</td>
</tr>
</tbody>
</table>

19. **Signature requirement and passing the final exam**

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching/study**

Macedonian

21. **Method of monitoring the quality of teaching**

Self-evaluation

22. **Literature**

<p>| | |</p>
<table>
<thead>
<tr>
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<tr>
<td><strong>Required literature</strong></td>
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<tr>
<td><strong>Order No.</strong></td>
<td><strong>Author</strong></td>
</tr>
<tr>
<td>1.</td>
<td>Bratica Temelkoska</td>
</tr>
</tbody>
</table>
Annex No.3

Program of the Course - first cycle studies

1. **Title of the Course** | Heat transfer
2. **Code** | MF102312
3. **Study Program** | Production Engineering /Transport, Organization and Logistics
4. **Organizer of the study program** | University Goce Delcev
| Faculty of Mechanical Engineering
5. **Cycle (first, second and third cycle)** | first cycle
6. **Academic year / semester** | II/IV semester
7. **Number of credits** | 4
8. **Professor (s)** | Assi. Prof. Radomir Cvetanoski, Ph.D
9. **Requirements for enrollment the Course** | No
10. **Purpose of the curriculum (competencies):** Introduction to basic concepts of heat and temperature, the basic types of heat transfer, conduction, convection and radiation, heat transfer devices, Heat and types of Heat, efficiency and design.
11. **Content of the course program:**
   1. Temperature and heat; Transmission of heat; conduction heat transfer; Convective heat transfer; Radiation heat transfer; Heat;
   2. Efficiency of heat exchangers; Classification of heat exchangers; Tubular heat exchangers; Plate heat exchangers; Regenerative heat exchangers; Designing heat exchangers;
12. **Learning methods:**
   Lectures with presentations through slides, exercises, independent elaboration and defense of the project task
13. **Total available time** | 120 hours
14. **Distribution of available time** | 2 +1+1 / per week
15. **Forms of teaching / learning activities** | 15.1. lectures / theoretical - contact teaching, 2
| 15.2. | theoretical and practical exercises, e-exams, preparation of independent seminar work | 1 |
| 16. | Other forms of activities | 16.1. Project tasks | hours |
| 16.2. | Individual tasks | 1 hours |
| 16.3. | Home learning | hours |
| 17. | Method of assessment | 17.1. Tests / oral exams | 70 points |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. | Activity and participation | 20 points |
| 18. | Assessment Criteria (points / score) | up 50 points | 5(five) (F) |
| | | 51 to 60 points | 6(six) (E) |
| | | 61 to 70 points | 7 (seven) (D) |
| | | 71 to 80 points | 8 (eight) (C) |
| | | 81 to 90 points | 9 (nine) (B) |
| | | 91 to 100 points | 10 (ten) (A) |
| 19. | Signature requirement and passing the final exam | 60% of pre-exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises |
| 20. | Language of teaching / study | Macedonian language |
| 21. | Method of monitoring the quality of teaching | Self-evaluation |

| 22. | Literature | Required literature |  |
| 22.1. | | No. | Author | Title | Publisher | Year |
| | | 1. | A. Mojsovski | Heat transfer and mass | UKIM | 1992 |
| | | 2. | | | |
| | | 3. | | | |

<p>| 22.2. | Additional literature | No. | Author | Title | Publisher | Year |
| | | 3. | | | |</p>
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<th>Program of the Course - first cycle studies</th>
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<tbody>
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<td>1. Title of the Course</td>
<td>Thermo-technical machines</td>
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<td>University Goce Delcev-Stip Faculty of Mechanical Engineering -Vinica</td>
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<td>8. Professor (s)</td>
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<td>9. Requirements for enrollment the Course</td>
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<td>10. Purposes of the curriculum (competencies):</td>
<td>Introduction to basic thermo technical machines, steam boilers, thermal turbines, steam turbines, heating appliances and air conditioning, cooling units, engine SVS.</td>
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<td>11. Content of the course program:</td>
<td>1.Types of energy; Energy sources; Steam boilers; Heat balance and heat losses; Coefficient of efficiency; Construction of steam boilers; Thermal turbines and plants. 2.Basic elements and classification of steam turbine units; Heating and cooling; ventilation plants; Refrigerating plants; Motor SVS; engine cycle in SVS.</td>
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<tr>
<td>12. Learning methods:</td>
<td>Lectures with presentations through slides, exercises, independent preparation and presentation of the project assignment</td>
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<td>13. Total available time</td>
<td>216</td>
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<td>14. Distribution of available time</td>
<td>3+2+2 / per week</td>
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<td>15. Forms of teaching / learning activities</td>
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<td>16. Other forms of activities</td>
<td>16.1. Project tasks 1 hours 16.2. Individual tasks 1 hours 16.3. Home learning hours</td>
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<td>17. Method of assessment</td>
<td>17.1. Tests / oral exams 70 points 17.2. Seminars (paper / project - presentation: written and/or oral) 10 points</td>
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### 17.3. Activity and participation

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<td></td>
<td>71 to 80 points</td>
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<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
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<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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### 19. Signature requirement and passing the final exam

- 60% of pre-exam activities or 42 points from the two mid-term exams, seminar papers, attendance of lectures and exercises

### 20. Language of teaching / study

- Macedonian

### 21. Method of monitoring the quality of teaching

- Self-evaluation

### 22. Literature

#### Required literature

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<tr>
<td>1.</td>
<td>Armenski Slave</td>
<td>Termodinamicki masini I uredi</td>
<td>UKIM</td>
<td>1995</td>
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#### Additional literature

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<th>Year</th>
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<tr>
<td>1.</td>
<td>Petrovski Ilija</td>
<td>Parni kotli</td>
<td>UKIM</td>
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<td>2.</td>
<td>Dimitrovski Mile</td>
<td>Motori SVS-teorija I sovremena oprema</td>
<td>UKIM</td>
<td>2001</td>
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### Annex No.3 Program of the Course - first cycle studies

<table>
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<tr>
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<th>Processing using cutting and plastic deformation</th>
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<tbody>
<tr>
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<td>3. Study Program</td>
<td>Production Engineering</td>
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<td>4. Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of Mechanical Engineering - Vinica Department of Production Engineering</td>
</tr>
<tr>
<td>5. Cycle (first, second and third cycle)</td>
<td>First cycle</td>
</tr>
<tr>
<td>6. Academic year / semester</td>
<td>Third year/ Fifth semester</td>
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<tr>
<td>7. Number of credits</td>
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<td>8. Professor (s)</td>
<td>Assi. Prof. Slavco Cvetkov, Ph.D.</td>
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<td>9. Requirements for enrollment the Course</td>
<td>None</td>
</tr>
<tr>
<td>10. Purposes of the curriculum (competencies):</td>
<td></td>
</tr>
</tbody>
</table>
Training and running processes by grinding, processing sheet with plastic deformation and processing technologies using spatial plastic deformation.

11. **Content of the course program:**
   1. **Processing using grinding:** Basics of the theory of processing using cutting. The quality of processing and economical cutting. Processing using cutting: production operations, the basic elements of the processed piece, cutting tool, resistance to cutting, speed cutting, sweep, the number of rotation, allowances for processing. Processing by milling, Saw logs, drilling, insertion, planning, grinding. Preparation of gears.
   2. **Processing using plastic deformation:** Elementary theoretical basis. Technology of processing metal sheets using cutting.

12. **Learning methods:**
Lectures, exercises, individual works, practical classes, home learning, consultations.

13. **Total available time**
216 hours

14. **Distribution of available time**
3+2+2 / per week

15. **Forms of teaching / learning activities**

| 15.1. | lectures / theoretical - contact teaching, e-teaching | 3 hours |
| 15.2. | theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 hours |

16. **Other forms of activities**

| 16.1. | Project tasks | 1 hours |
| 16.2. | Individual tasks |
| 16.3. | Home learning | 1 hours |

17. **Method of assessment**

| 17.1. | Tests / oral exams | 70 points |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. | Activity and participation | 20 points |

18. **Assessment Criteria (points / score)**

<table>
<thead>
<tr>
<th>Points</th>
<th>Score</th>
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<tbody>
<tr>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

19. **Signature requirement and passing the final exam**
60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**
Macedonian

21. **Method of monitoring the quality of teaching**
Self-evaluation
**Annex No.3 | Program of the Course - first cycle studies**

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Code</th>
<th>Study Program</th>
<th>Organizer of the study program (unit or institute, Faculty, department)</th>
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<tbody>
<tr>
<td>1.</td>
<td>CAD technology</td>
<td>2MF101112</td>
<td>Production Engineering</td>
<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering -Vinica</td>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Cycle (first, second and third cycle)</th>
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<td>4.</td>
<td>First cycle</td>
<td>third / fifth</td>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Professor (s)</th>
<th>Requirements for enrollment the Course</th>
<th>Purposes of the curriculum (competencies):</th>
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<tr>
<td>5.</td>
<td>Assi. Prof. Simeon Simeonov, Ph.D</td>
<td>No</td>
<td>Students are introduced to the basics and application of CAD technology in mechanical engineering</td>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Content of the course program:</th>
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<tbody>
<tr>
<td>6.</td>
<td>Introduction to CAD technology, 2D documentation, Dimensions, Making templates, Primitives obtained by extruding, Primitives obtained by rotation, Primitives obtained by</td>
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</table>

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### Required literature

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<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Slavco Cvetkov</td>
<td>Processing using cutting and plastic deformation-script</td>
<td>UGD-Stip Mechanical faculty-Vinica</td>
<td>2013</td>
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### Additional literature

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<tr>
<td>1.</td>
<td>Milisav Kalajdžić</td>
<td>Technology of machine construction</td>
<td>Mechanical faculty, Belgrade</td>
<td>2006</td>
</tr>
<tr>
<td>2.</td>
<td>Joko Stanić</td>
<td>Processing theory of processes</td>
<td>Mechanical faculty, Belgrade</td>
<td>1994</td>
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<tr>
<td>3.</td>
<td>J. Lazarev, V. Strezov</td>
<td>Machines and processing using deformation</td>
<td>Mechanical faculty, Skopje</td>
<td>2001</td>
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<tr>
<td>4.</td>
<td>D. M. Nikolić</td>
<td>Theory of processing II</td>
<td>Mechanical faculty, Belgrade</td>
<td>1999</td>
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<td>5.</td>
<td>D. M. Nikolić</td>
<td>Theory of processing II</td>
<td>Mechanical faculty, Belgrade</td>
<td>1999</td>
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</table>
12. **Learning methods:**
   Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.

13. **Total available time** 156 hours

14. **Distribution of available time**
   2 +2 +1/ per week

15. **Forms of teaching / learning activities**
   15.1. lectures / theoretical - contact teaching, e-teaching 2 hours
   15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work 2hours

16. **Other forms of activities**
   16.1. Project tasks
   16.2. Individual tasks 1 hour
   16.3. Home learning

17. **Method of assessment**
   17.1. Tests / oral exams 70
   17.2. Seminars (paper / project - presentation: written and/or oral) 10
   17.3. Activity and participation 20

18. **Assessment Criteria (points / score)**
   - to 50 points 5(five)(F)
   - from 51 to 60 points 6(six) (E)
   - from 61 to 70 points 7 (seven) (D)
   - from 71 to 80 points 8 (eight) (C)
   - from 81 to 90 points 9 (nine) (B)
   - from 91 to 100 points 10 (ten) (A)

19. **Signature requirement and passing the final exam**
   60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**
   Macedonian

21. **Method of monitoring the quality of teaching**
   Self-evaluation

22. **Literature**

<table>
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## Program of the Course - first cycle studies

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<th>Title of the Course</th>
<th>Code</th>
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<th>Academic year / semester</th>
<th>Number of credits</th>
<th>Professor(s)</th>
<th>Requirements for enrollment the Course</th>
<th>Purposes of the curriculum (competencies):</th>
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<tr>
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<td>Sustainable energy systems</td>
<td>2MF102412</td>
<td>Production Engineering</td>
<td>University Goce Delcev-Stip</td>
<td>first cycle</td>
<td>III/V semester</td>
<td>4</td>
<td>Assi. Prof. Radomir Cvetanoski, Ph.D</td>
<td>Introduction to sustainable energy systems, solar energy, geothermal energy, biomass, wind energy.</td>
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<td>2.</td>
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<td>Faculty of mechanical engineering - Vinica</td>
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<td>1. Introduction; Classification of sustainable energy systems; Solar energy - features; Devices and application of solar energy for hot water; Devices and application of solar energy for electricity; General geothermal energy; 2.Application of geothermal energy; Energy from biomass - potential sources; obtaining fuel from biomass; devices for obtaining fuel from biomass; wind energy; wind turbines and their application</td>
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<tr>
<td></td>
<td>Lectures with presentations through slides, exercises, independent elaboration and defense of the project task</td>
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<td>15.</td>
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<tr>
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<td>15.1 lectures / theoretical - contact teaching, e-teaching</td>
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<td></td>
<td>15.2 theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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### Notes
- **Annex No.3**
- **G. Devedzik**
- **CAD/CAM technology**
- **Mechanical faculty, Kraguevac**
- **2004**
<table>
<thead>
<tr>
<th>16. Other forms of activities</th>
<th>16.1. Project tasks</th>
<th>hours</th>
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<td>16.2. Individual tasks</td>
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<td>17.1. Tests / oral exams</td>
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<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
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<tr>
<td></td>
<td>51 to 60 points</td>
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<td>71 to 80 points</td>
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<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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| 19. Signature requirement and passing the final exam | 60% of pre-exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises |

| 20. Language of teaching / study | Macedonian language |

| 21. Method of monitoring the quality of teaching | Self-evaluation |

<table>
<thead>
<tr>
<th>22. Literature</th>
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<table>
<thead>
<tr>
<th>Annex No.3</th>
<th>Program of the Course - first cycle studies</th>
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<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
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<td>2.</td>
<td>Code</td>
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<td>Requirements for enrollment the Course</td>
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<td>Purposes of the curriculum (competencies):</td>
</tr>
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<td>11</td>
<td>Content of the course program:</td>
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<tr>
<td>12</td>
<td>Learning methods:</td>
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<td>13</td>
<td>Total available time</td>
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<tr>
<td>14</td>
<td>Distribution of available time</td>
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<tr>
<td>15</td>
<td>Forms of teaching / learning activities</td>
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<td>15.2 theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<td>16</td>
<td>Other forms of activities</td>
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<td>16.1</td>
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<td>16.2 Individual tasks</td>
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<td>16.3 Home learning</td>
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<td>Method of assessment</td>
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<td>18.2 from 51 to 60 points</td>
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<tr>
<td>1. S. Simeonov</td>
<td>UGD-Stip</td>
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<tr>
<td>2. J. Jancevski</td>
<td>Mechanical faculty Skopje</td>
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<thead>
<tr>
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<tr>
<td>1. Sava Dedier</td>
<td>Mechanical faculty -Beograd</td>
<td>1971</td>
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<td>2. Sotir Panovski</td>
<td>Technical faculty -Bitola</td>
<td>2009</td>
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<tr>
<th>Annex No.3</th>
<th>Program of the Course - first cycle studies</th>
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<td>Production Engineering /Transport, Organization and Logistics</td>
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<td>5. Cycle (first, second and third cycle)</td>
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<td>Third/sixth</td>
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<td>Description</td>
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<td>10. Purposes of the curriculum (competencies):</td>
<td>Learning in the field of engineering economic, the methods and analysis, as well as making investment decisions among project alternatives. Strengthening analytical skills related to financial information.</td>
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</table>
| 11. Contents of the course program: | 1. Introduction to the economic methods applied in engineering  
  2. Decision-making methods  
  3. Studying of cash flow concepts  
  4. Rate of return, return of investments,  
  5. Financial indicators for profitability, effectiveness, efficiency,  
  6. Cost analysis, revenue, profits,  
  7. Balance sheet and income statement  
  8. Studying of basic economic value analysis (present value, annual analysis, incremental analysis, cost/ benefit analysis)  
  9. Methods for calculating of depreciation  
  10. Techniques for estimating of equipment replacement  
  11. Making investment decisions among project alternatives  
  12. Learning techniques for preparation of a business plan and feasibility study |
| 12. Learning methods: | Interactive teaching, exercises, individual and/or team work on projects, consultations and individual learning |
| 13. Total available time | 120 hours |
| 14. Distribution of available time | 2 +1 +1 |
| 15. Forms of teaching / learning activities | 15.1. lectures / theoretical - contact teaching, e-teaching  
  15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work |
| 16. Other forms of activities | 16.1. Project tasks  
  16.2. Individual tasks  
  16.3. Home learning |
| 17. Method of assessment | |
## Tests / oral exams

<table>
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<tr>
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<tr>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
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<tr>
<td>17.3. Activity and participation</td>
<td>20</td>
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</table>

## Assessment Criteria (points / score)

<table>
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<tr>
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<tr>
<td>to 50 points</td>
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<tr>
<td>from 51 to 60 points</td>
<td>6(six) (E)</td>
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<tr>
<td>from 61 to 70 points</td>
<td>7 (seven) (D)</td>
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<tr>
<td>from 71 to 80 points</td>
<td>8 (eight) (C)</td>
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<tr>
<td>from 81 to 90 points</td>
<td>9 (nine) (B)</td>
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<tr>
<td>from 91 to 100 points</td>
<td>10 (ten) (A)</td>
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</table>

## Signature requirement and passing the final exam

- 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions
- Minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

## Language of teaching / study

- Macedonian

## Method of monitoring the quality of teaching

- Self-evaluation

## Literature

### Required literature

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<thead>
<tr>
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<th>Title</th>
<th>Publisher</th>
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<tr>
<td>1.</td>
<td>V. Gecevska</td>
<td>Engineering Economics</td>
<td>Faculty of Mechanical Engineering, UKIM, Skopje</td>
<td>2010</td>
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<tr>
<td>2.</td>
<td>D. Bojadzhioski</td>
<td>Enterprise Economics</td>
<td>Economic Faculty Skopje</td>
<td>1999</td>
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### Additional literature

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<td><strong>Professor (s)</strong></td>
<td>Assi. Prof. Slavco Cvetkov, Ph.D</td>
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<td>Passed exam of Processing using cutting and plastic deformation</td>
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<td>10.</td>
<td><strong>Purposes of the curriculum (competencies):</strong></td>
<td>Training to use treatment processes of plastic deformation and processing machines as well as design and construction of tools for plastic deformation processing.</td>
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<td>12.</td>
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<td>16.2. Individual tasks</td>
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<td>17.3. Activity and participation</td>
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<td>18.</td>
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<tr>
<td></td>
<td>up 50 points</td>
<td>5 (five) (F)</td>
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<td></td>
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<tr>
<td></td>
<td>51 to 60 points</td>
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<td></td>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
<td></td>
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<td></td>
<td>71 to 80 points</td>
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<td></td>
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<td></td>
<td>81 to 90 points</td>
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<tr>
<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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</table>
19. Signature requirement and passing the final exam
   60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending to lectures and discussions

20. Language of teaching / study
   Macedonian

21. Method of monitoring the quality of teaching
   Self-evaluation

22. Literature

   Required literature
<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Slavco Cvetkov</td>
<td>Machines and tools for plastic processing - script</td>
<td>UGD-Stip Mechanical faculty-Vinica</td>
<td>2013</td>
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   Additional literature
<table>
<thead>
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<th>No.</th>
<th>Author</th>
<th>Title</th>
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<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>J, Lazarev V, Strezov.</td>
<td>Machines and processing with deformation</td>
<td>Mechanical faculty, Skopje</td>
<td>1994</td>
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<td>3.</td>
<td>B. Musafija</td>
<td>Metal processing using plastic deformation</td>
<td>Svjetlost Sarajevo</td>
<td>2001</td>
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Annex No.3

Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>1.</th>
<th>Title of the Course</th>
<th>Basics of internal combustion engines</th>
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<tbody>
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<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production Engineering</td>
</tr>
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<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University “Goce Delcev”- Stip, Faculty of Mechanical Engineering -Vinica</td>
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<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
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<td>6.</td>
<td>Academic year / semester</td>
<td>third / fifth</td>
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<td>Number of ECTS credits</td>
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<td>Assi. Prof. Zlatko V. Sovreski, Ph.D</td>
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<tr>
<td></td>
<td>Requirements for enrollment the Course</td>
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<tr>
<td></td>
<td>Introduction to basic Thermotechnical machines - steam boilers, thermal turbines, steam turbines, devices heating and air conditioning, refrigeration plants, internal combustion engines</td>
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<tr>
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<td>Contents of the course program:</td>
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<tr>
<td></td>
<td>Types of energy; energy sources; steam boilers; Heat balance and heat losses; Useful coefficient; construction of steam boilers; Thermal turbines and plants. Basic elements and classification steam turbines plants; Heating and cooling; ventilation plants; Refrigerating plants; Motor cycles in engines internal combustion</td>
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<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<td>16.</td>
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<td>Project tasks</td>
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<td>16.1.</td>
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<td>17.</td>
<td>Method of assessment</td>
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<td>17.1.</td>
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<td>Seminars (paper / project - presentation: written and/or oral)</td>
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<td>17.3.</td>
<td>Activity and participation</td>
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<tr>
<td>18.</td>
<td>Assessment Criteria (points / score)</td>
<td>up 50 points</td>
</tr>
<tr>
<td></td>
<td>51 to 60 points</td>
<td>5(five) (F)</td>
</tr>
<tr>
<td></td>
<td>61 to 70 points</td>
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<tr>
<td></td>
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<tr>
<td>19.</td>
<td>Signature requirement and passing the final exam</td>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
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<td>21.</td>
<td>Method of monitoring the quality of teaching</td>
<td>Self-evaluation</td>
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</table>
## Program of the Course - first cycle studies

### 1. Title of the Course
Metalcutting machines and devices

### 2. Code
2MF101312

### 3. Study Program
Production Engineering

### 4. Organizer of the study program (unit or institute, Faculty, department)
University Goce Delcev-Štip
Faculty of Mechanical Engineering - Vinica
Department of Production Engineering

### 5. Cycle (first, second and third cycle)
First cycle

### 6. Academic year / semester
Third year/ Sixth semester

### 7. Number of credits
6

### 8. Professor (s)
Assi. Prof. Slavco Cvetkov, Ph.D.

### 9. Requirements for enrollment the Course
Passed exam of Processing using cutting and plastic deformation

### 10. Purposes of the curriculum (competencies):
Training to use processing machines for cutting (metalcutting machines) as well as design and construction of devices for metalcutting machines

### 11. Content of the course program:
1. **Metalcutting machines.** Basic parts (construction) of the metalcutting machines.
Lathes, milling machines, cutting machines, boring mills, grinding machines (grinders), insertion machines, mill drill, machines for fine processing and processing centers.


### 12. Learning methods:
Lectures, exercises, individual work, practical classes, home learning, consultations.

### 13. Total available time
156 hours

### 14. Distribution of available time
2+2+1 / per week

### 15. Forms of teaching / learning activities

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### 16. Other forms of activities

<table>
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<th>16.1.</th>
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<td>Individual tasks</td>
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<td>Home learning</td>
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### 17. Method of assessment

<table>
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<td>Activity and participation</td>
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### 18. Assessment Criteria (points / score)

- up 50 points: 5 (five) (F)
- 51 to 60 points: 6 (six) (E)
- 61 to 70 points: 7 (seven) (D)
- 71 to 80 points: 8 (eight) (C)
- 81 to 90 points: 9 (nine) (B)
- 91 to 100 points: 10 (ten) (A)

### 19. Signature requirement and passing the final exam
60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

### 20. Language of teaching / study
Macedonian

### 21. Method of monitoring the quality of teaching
Self-evaluation

### 22. Literature

#### 22.1. Required literature

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<tr>
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<td>Contents of the course program:</td>
<td>Introduction to Mechatronics; Collecting data; Sensors; Electric actuators systems; Mechanical actuators systems; Management Theory: modeling; Control Theory: analyses; robotic systems; Reliability concept of mechatronic systems; research studies: CNC machines and robotic arm; design of mechatronic systems;</td>
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<td>12.</td>
<td>Learning methods:</td>
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<table>
<thead>
<tr>
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<tbody>
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<td>17.2</td>
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<td></td>
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<tr>
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<table>
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<th>Signature requirement and passing the final exam</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>20.</th>
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<tr>
<td></td>
<td>Macedonian</td>
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<table>
<thead>
<tr>
<th>21.</th>
<th>Method of monitoring the quality of teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-evaluation</td>
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<table>
<thead>
<tr>
<th>22.</th>
<th>Literature</th>
</tr>
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<tbody>
<tr>
<td>22.1</td>
<td>Required literature</td>
</tr>
<tr>
<td>Order No.</td>
<td>Author</td>
</tr>
<tr>
<td>1.</td>
<td>Godfrej C.Onvubolu</td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
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</tr>
</tbody>
</table>

<p>| 22.2 | Additional literature |
| Order No. | Author | Title | Publisher | Year |
| 1. | | | |
| 2. | | | |
| 3. | | | |</p>
<table>
<thead>
<tr>
<th>Annex No.3</th>
<th>Program of the Course - first cycle studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
</tr>
<tr>
<td>2.</td>
<td>Code</td>
</tr>
<tr>
<td>3.</td>
<td>Study Program</td>
</tr>
<tr>
<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
</tr>
<tr>
<td>6.</td>
<td>Academic year / semester</td>
</tr>
<tr>
<td>7.</td>
<td>Number of credits</td>
</tr>
<tr>
<td>8.</td>
<td>Professor (s)</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies): Students are introduced to the characteristics of the waste collection, transportation and recycling.</td>
</tr>
<tr>
<td>11.</td>
<td>Content of the course program: Sources, properties and types of solid waste; Determination of physical, chemical and biological characteristics of the solid waste; Factors affecting the occurrence of solid waste; Waste collection and transport, handling, storage and solid waste compression; Dangerous radioactive wastes; medical waste; Solid waste recycling; Biological Treatment of solid waste; thermal treatment of waste; burning and the use of heat, gasification and plasma technique; Application of different methods of energy use during heat treatment; sanitary storage of waste.</td>
</tr>
<tr>
<td>12.</td>
<td>Learning methods: Lecturing, exercises</td>
</tr>
<tr>
<td>13.</td>
<td>Total available time</td>
</tr>
<tr>
<td>14.</td>
<td>Distribution of available time</td>
</tr>
<tr>
<td>15.</td>
<td>Forms of teaching / learning activities</td>
</tr>
<tr>
<td>17.</td>
<td>Method of assessment</td>
</tr>
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### Activity and participation

<table>
<thead>
<tr>
<th>Assessment Criteria (points / score)</th>
<th>up 50 points</th>
<th>5(five) (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>51 to 60 points</td>
<td>6(six) (E)</td>
<td></td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
<td></td>
</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
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</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
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</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
<td></td>
</tr>
</tbody>
</table>

### Signature requirement and passing the final exam

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

### Language of teaching / study

Macedonian

### Method of monitoring the quality of teaching

Self-evaluation

### Literature

<table>
<thead>
<tr>
<th>Required literature</th>
<th>No.</th>
<th>Author</th>
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<table>
<thead>
<tr>
<th>Additional literature</th>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
</table>

1. Ilik
   Upravljanjem cvrstim otpadom
   Institut za ispitivanje materijala Beograd
   1998

2. 

3. 

### Annex No.3 - Program of the Course - first cycle studies

1. Title of the Course: Welding and assembly
2. Code: 2MF101412
3. Study Program: Production Engineering
4. Organizer of the study program (unit or institute, Faculty, department): University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica
5. Cycle (first, second and third cycle): First cycle
6. Academic year / semester: third/ sixth
7. Number of ECTS credits: 6
8. Professor (s): Assi. Prof. Bratica Temelkoska, Ph.D
9. Requirements for enrollment the Course: No
### Purposes of the curriculum (competencies):
Students are introduced to the types of welding, technologies and their application.

### Content of the course program:
- Introduction to Welding Technology; Gas welding; arc welding; gas arc welding protection; arc welding; resistance welding, Special welding procedures; Related welding procedures: build-up welding, brazing, soldering; Procedures of merging new materials: welding composites, ceramic materials and plastics; Welding other metal materials. Structure and properties of metals. Structure of the welded junction; corrosion of welded junction. Heat treatment of the base fabric and welded junction; Installation of welded constructions.

### Learning methods:
Theory, practical teaching and auditory exercises.

### Total available time
156 hours

### Distribution of available time
2+2+1

### Forms of teaching / learning activities
| 15.1. lectures / theoretical - contact teaching, e-teaching | 2 |
| 15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 |

### Other forms of activities
| 16.1. Project tasks |
| 16.2. Individual tasks | 1 |
| 16.3. Home learning |

### Method of assessment
| 17.1. Tests / oral exams | 70 points |
| 17.2. Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. Activity and participation | 20 points |

### Assessment Criteria (points / score)
- up 50 points: 5 (five) (F)
- 51 to 60 points: 6 (six) (E)
- 61 to 70 points: 7 (seven) (D)
- 71 to 80 points: 8 (eight) (C)
- 81 to 90 points: 9 (nine) (B)
- 91 to 100 points: 10 (ten) (A)

### Signature requirement and passing the final exam
- 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions.

### Language of teaching / study
Macedonian

### Method of monitoring the quality of teaching
Self-evaluation

### Literature

<p>| 22.1. Required literature |</p>
<table>
<thead>
<tr>
<th>Order No.</th>
<th>Author</th>
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<tbody>
<tr>
<td>1.</td>
<td>B.Temelkoska</td>
<td>Merging materials-textbook</td>
<td>University “Goce Delcev”-Stip. Faculty of Mechanical Engineering -Vinica</td>
<td>2010</td>
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### Additional literature

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<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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</tr>
<tr>
<td>3.</td>
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</table>
**Study program: PRODUCTION ENGINEERING (4 years)**

<table>
<thead>
<tr>
<th>I Semester - First year</th>
<th>Mandatory subjects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUBJECTS</strong></td>
<td><strong>ECTS</strong></td>
<td><strong>Hours</strong></td>
</tr>
<tr>
<td>Mathematics I</td>
<td>8</td>
<td>3+2+2</td>
</tr>
<tr>
<td>Mechanical materials</td>
<td>8</td>
<td>3+2+2</td>
</tr>
<tr>
<td>Computer Science</td>
<td>6</td>
<td>2+2+1</td>
</tr>
<tr>
<td>Elective subject from the faculty 1</td>
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</tr>
<tr>
<td>Elective subject from the faculty 2</td>
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<td>2+1+1</td>
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<tr>
<td><strong>Total:</strong></td>
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<td>12+8+7</td>
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</table>

<table>
<thead>
<tr>
<th>I Semester - First year</th>
<th>Elective subjects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUBJECTS</strong></td>
<td><strong>ECTS</strong></td>
<td><strong>Hours</strong></td>
</tr>
<tr>
<td>Basics of Physics</td>
<td>4</td>
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</tr>
<tr>
<td>Physics II</td>
<td>4</td>
<td>2+1+1</td>
</tr>
<tr>
<td>Electrotechnics and elektronics</td>
<td>4</td>
<td>2+1+1</td>
</tr>
<tr>
<td>Casting technology</td>
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</table>

<table>
<thead>
<tr>
<th>II Semester - First year</th>
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</thead>
<tbody>
<tr>
<td><strong>SUBJECTS</strong></td>
<td><strong>ECTS</strong></td>
<td><strong>Hours</strong></td>
</tr>
<tr>
<td>Mathematics II</td>
<td>8</td>
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</tr>
<tr>
<td>Engineering graphics</td>
<td>6</td>
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</tr>
<tr>
<td>Technical Mechanics I (statics)</td>
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<td>2+2+1</td>
</tr>
<tr>
<td>Elective subject from the faculty 3</td>
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<td>Elective subject from the University 1</td>
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### II Semester - First year

**Elective subjects**

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<th>Hours</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Engineering logistics</td>
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</table>

### III Semester - Second year

**Mandatory subjects**

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<th>SUBJECTS</th>
<th>ECTS</th>
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</thead>
<tbody>
<tr>
<td>Thermodynamics</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
</tr>
<tr>
<td>Strength of materials</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
</tr>
<tr>
<td>Technical Mechanics II (kinematics, dynamics, oscillations)</td>
<td>6</td>
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<td>156</td>
</tr>
<tr>
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**Elective subjects**

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<th>ECTS</th>
<th>Hours</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Corrosion and corrosion protection</td>
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<tr>
<td>Probability and statistics</td>
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<tr>
<td>Ergonomics</td>
<td>4</td>
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<tr>
<td>Industrial Management</td>
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### VI Semester - Third year

#### Mandatory subjects

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<td>Machines and tools for plastic processing,</td>
<td>8</td>
<td>3+2+2</td>
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<tr>
<td>Metal cutting machines and devices</td>
<td>6</td>
<td>2+2+1</td>
<td>156</td>
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<tr>
<td>Welding and assembly</td>
<td>6</td>
<td>2+2+1</td>
<td>156</td>
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<tr>
<td>Elective university subject</td>
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#### Elective subjects

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<tr>
<td>Mechatronics</td>
<td>4</td>
<td>2+1+1</td>
<td>120</td>
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<tr>
<td>Waste management</td>
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<td>2+1+1</td>
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### VII Semester - Fourth year

#### Mandatory subjects

<table>
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<th>Hours</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic machinery and components</td>
<td>8</td>
<td>3+2+2</td>
<td>216</td>
</tr>
<tr>
<td>Heating, air conditioning and heat systems</td>
<td>8</td>
<td>3+2+2</td>
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<tr>
<td>Basics of automatic control</td>
<td>6</td>
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</tr>
<tr>
<td>Elective subject from the faculty</td>
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<td>2+1+1</td>
<td>120</td>
</tr>
<tr>
<td>Elective subject from the faculty</td>
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## VII Semester - Fourth year

Elective subjects

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<th>Hours</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Design of technological processes</td>
<td>4</td>
<td>2+1+1</td>
<td>120</td>
</tr>
<tr>
<td>Programming of Computer Numerically Control (CNC) machines</td>
<td>4</td>
<td>2+1+1</td>
<td>120</td>
</tr>
<tr>
<td>Modelling and simulations</td>
<td>4</td>
<td>2+1+1</td>
<td>120</td>
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<tr>
<td>Industrial Ventilation</td>
<td>4</td>
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## VIII Semester - Fourth year

Man Elective subject from the University datory subjects

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<th>Hours</th>
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</thead>
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<tr>
<td>Quality Management</td>
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<td>2+2+1</td>
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</tr>
<tr>
<td>Occupational Safety and Health</td>
<td>6</td>
<td>2+2+1</td>
<td>156</td>
</tr>
<tr>
<td>Elective subject from the University 4</td>
<td>6</td>
<td>2+2+1</td>
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</tr>
<tr>
<td>Elective subject from the faculty 12</td>
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<td>2+1+1</td>
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<tr>
<td>Diploma Thesis</td>
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<td><strong>Total:</strong></td>
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## VIII Semester - Fourth year

Elective subjects

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>ECTS</th>
<th>Hours</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Aided Manufacturing (CAM)</td>
<td>4</td>
<td>2+1+1</td>
<td></td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>4</td>
<td>2+1+1</td>
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</table>
### Annex No.3

**Program of the Course - first cycle studies**

1. **Title of the Course**: Mathematics 1
2. **Code**: 2FI100112
3. **Study Program**: Production Engineering / Transport, Organization and Logistics
4. **Organizer of the study program (unit or institute, Faculty, department)**: University Goce Delcev-Stip
   Faculty of mechanical engineering - Vinica
5. **Cycle (first, second and third cycle)**: First cycle
6. **Academic year / semester**: first/first  
7. **Number of credits**: 8
8. **Professor (s)**: Prof. Jordan Zivanovik PhD
9. **Requirements for enrollment the Course**: no
10. **Purposes of the curriculum (competencies)**: Upgrading high school mathematics knowledge and introduction to higher mathematics
11. **Content of the course program**:
12. **Learning methods**:
    Lectures, laboratory exercises, numerical exercises, e-learning, seminar work, teamwork, consultation
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>13.</td>
<td><strong>Total available time</strong></td>
<td>216 hours</td>
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<td>14.</td>
<td><strong>Distribution of available time</strong></td>
<td>3+2+2 / per week</td>
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<tr>
<td>15.</td>
<td><strong>Forms of teaching / learning activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.1.</td>
<td>lectures / theoretical - contact teaching, e-teaching</td>
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</tr>
<tr>
<td></td>
<td>15.2.</td>
<td>theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
<td>2</td>
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<tr>
<td>16.</td>
<td><strong>Other forms of activities</strong></td>
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<td>16.1.</td>
<td>Project tasks</td>
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<td>16.2.</td>
<td>Individual tasks</td>
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<td>16.3.</td>
<td>Home learning</td>
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<tr>
<td>17.</td>
<td><strong>Method of assessment</strong></td>
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<td></td>
</tr>
<tr>
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<td>17.1.</td>
<td>Tests / oral exams</td>
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<td>Seminars (paper / project - presentation: written and/or oral)</td>
<td>10 points</td>
</tr>
<tr>
<td></td>
<td>17.3.</td>
<td>Activity and participation</td>
<td>20 points</td>
</tr>
<tr>
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<td><strong>Assessment Criteria (points / score)</strong></td>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
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<td></td>
<td>71 to 80 points</td>
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<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
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<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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<tr>
<td>19.</td>
<td><strong>Signature requirement and passing the final exam</strong></td>
<td>60% success from all pre-exam activities ie. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises</td>
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<tr>
<td>20.</td>
<td><strong>Language of teaching / study</strong></td>
<td>Macedonian</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td><strong>Method of monitoring the quality of teaching</strong></td>
<td>Self-evaluation</td>
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</tr>
<tr>
<td>22.</td>
<td><strong>Literature</strong></td>
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<td>22.1.</td>
<td><strong>Required literature</strong></td>
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</table>
Annex No.3

Program of the Course - first cycle studies

1. Title of the Course
   Mechanical materials

2. Code
   2MF100112

3. Study Program
   Production engineering/Transport Organization and Logistics

4. Organizer of the study program (unit or institute, Faculty, department)
   University Goce Delcev-Stip
   Faculty of mechanical engineering - Vinica

5. Cycle (first, second and third cycle)
   First cycle

6. Academic year / semester
   First/I semester

7. Number of credits
   8
<table>
<thead>
<tr>
<th>8.</th>
<th>Professor(s)</th>
<th>Slavco Cvetkov, PhD, Assi. Professor</th>
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<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
<td>No</td>
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<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies): At the end of the course, students will have competences obtained through the necessary fund of theoretical, methodological and applicative studying in the area of mechanical materials.</td>
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<td>11.</td>
<td>Content of the course program:</td>
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</tr>
<tr>
<td></td>
<td>1. Introduction to the materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Division and structure of metals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Alloys and state diagram</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Steels: Obtaining and labelling</td>
<td></td>
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<tr>
<td></td>
<td>5. Carbon steels: structural and tool steels</td>
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</tr>
<tr>
<td></td>
<td>6. Alloy steel: structural and tool steels</td>
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<td></td>
<td>7. Heat treatment of steels</td>
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</tr>
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<td></td>
<td>8. Surface hardening of steels</td>
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</tr>
<tr>
<td></td>
<td>9. Cast iron: gray iron and malleable iron</td>
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<tr>
<td></td>
<td>10. Non ferrous metals and their alloys</td>
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<tr>
<td></td>
<td>11. Ceramics, glass and composites</td>
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<td>12. Polymers and non metals (wood, leather, rubber)</td>
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<tr>
<td>12.</td>
<td>Learning methods:</td>
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<tr>
<td></td>
<td>- Teaching, exercises, projects assignment</td>
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<tr>
<td>13.</td>
<td>Total available time</td>
<td>216</td>
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<td>14.</td>
<td>Distribution of available time</td>
<td>3 + 2 + 2 / per week</td>
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<tr>
<td>15.</td>
<td>Forms of teaching / learning activities</td>
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<tr>
<td>15.1.</td>
<td>lectures / theoretical - contact teaching, e-teaching</td>
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<tr>
<td>15.2.</td>
<td>theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<tr>
<td>16.</td>
<td>Other forms of activities</td>
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<tr>
<td>16.1.</td>
<td>Project tasks</td>
<td>1 hours</td>
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<tr>
<td>16.2.</td>
<td>Individual tasks</td>
<td>1 hours</td>
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</table>
## Method of assessment

17. **Tests / oral exams**
   - 70 points

17. **Seminars (paper / project - presentation: written and/or oral)**
   - 10 points

17. **Activity and participation**
   - 20 points

### Assessment Criteria (points / score)

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Score</th>
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<tbody>
<tr>
<td>up 50 points</td>
<td>5(five) (F)</td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6(six) (E)</td>
</tr>
<tr>
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<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

18. **Signature requirement and passing the final exam**
   - 60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

19. **Language of teaching / study**
   - Macedonian

20. **Method of monitoring the quality of teaching**
   - Self-evaluation

## Literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Angel Tasevski, PhD Vladan Andonovic, MsC</td>
<td>Mechanical materials</td>
<td>UGD - Stip</td>
<td>2011</td>
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<td>2.</td>
<td>Angel Tasevski, PhD Vladan Andonovic, MsC</td>
<td>Mechanical materials estimation</td>
<td>UGD - Stip</td>
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### Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>Annex No.3</th>
<th>Program of the Course - first cycle studies</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Title of the Course</strong></td>
</tr>
<tr>
<td>2.</td>
<td><strong>Code</strong></td>
</tr>
<tr>
<td>3.</td>
<td><strong>Study program</strong></td>
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<tr>
<td>4.</td>
<td><strong>Organizer of the study program (unit or institute, Faculty, department)</strong></td>
</tr>
<tr>
<td>5.</td>
<td><strong>Cycle (first, second, or third study cycle)</strong></td>
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<tr>
<td>6.</td>
<td><strong>Academic year / semester</strong></td>
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<td>7.</td>
<td><strong>Number of credits</strong></td>
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<td>8.</td>
<td><strong>Professor (s)</strong></td>
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<td>9.</td>
<td><strong>Requirements for enrollment the Course</strong></td>
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<tr>
<td>10.</td>
<td><strong>Purposes of the curriculum (competencies):</strong></td>
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<td>11.</td>
<td><strong>Contents of the course program:</strong></td>
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</tbody>
</table>
- Information systems: introduction, types, ERP, CRM, HR, SCM;
- Content Management Systems CMS: DMS, DAMS, WCM, ECP, ERS;
- Databases: fundamentals, types, use

12. **Learning methods**: Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.

13. **Total available time** | 156 hours

14. **Distribution of available time** | 2+2+1

15. **Forms of teaching / learning activities**

| 15.1 | lectures / theoretical - contact teaching, e-teaching | 2 |
| 15.2 | theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 |

16. **Other forms of studying activities**

| 16.1 | Project tasks |
| 16.2 | Individual tasks | 1 |
| 16.3 | Home learning |

17. **Method of assessment**

| 17.1 | Tests / oral exams | 70 points |
| 17.2 | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3 | Activity and participation | 20 points |

18. **Assessment Criteria (points / score)**

| Up to 50 points | 5 (five) (F) |
| 51 to 60 points | 6 (six) (E) |
| 61 to 70 points | 7 (seven) (D) |
| 71 to 80 points | 8 (eight) (C) |
| 81 to 90 points | 9 (nine) (B) |
| 91 to 100 points | 10 (ten) (A) |

19. **Signature requirement and passing the final exam**

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**

Macedonian

21. **Method of monitoring the quality of teaching**

Self-evaluation
Program of the Course - first/second/third cycle studies

1. Title of the Course
   Basics of Physics

2. Code
   2FP120512

3. Study Program
   Production Engineering

4. Organizer of the study program (unit or institute, Faculty, department)
   University Goce Delcev
   Faculty of mechanical engineering

5. Cycle (first, second and third cycle)
   First cycle

6. Academic year / semester
   1/1
   7. Number of credits
   4

8. Professor (s)
   Prof. Todor Delipetrov, PhD

9. Requirements for enrollment the Course
   enrolled semester

10. Purposes of the curriculum (competencies):
Students are introduced to the basic concepts and laws of physics (Newton’s laws, Hooke’s law), elasticity and plasticity of bodies

11. Content of the course program:

12. Learning methods:
Lectures, exercises (numerical and practical), papers and home learning

13. Total available time 216 hours

14. Distribution of available time 2 + 1 + 1 / per week

15. Forms of teaching / learning activities
15.1. lectures / theoretical - contact teaching, e-teaching
15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work

16. Other forms of activities
16.1. Project tasks
16.2. Individual tasks 1
16.3. Home learning

17. Method of assessment
17.1. Tests / oral exams 70 points
17.2. Seminars (paper / project - presentation: written and/or oral) 10 points
17.3. Activity and participation 20 points

18. Assessment Criteria (points / score) up 50 points 5 (five) (F)
51 to 60 points 6 (six) (E)
61 to 70 points 7 (seven) (D)
71 to 80 points 8 (eight) (C)
81 to 90 points 9 (nine) (B)
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<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Todor Delipetrov</td>
<td>Physics 1</td>
<td>RGF</td>
<td>2003</td>
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<td>3.</td>
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### Additional literature

<table>
<thead>
<tr>
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<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Lj. Petkovski</td>
<td>General physics</td>
<td>UKIM</td>
<td>1995</td>
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<td>2.</td>
<td>Z. Stojanov</td>
<td>General physics, book 1</td>
<td>UKIM</td>
<td>1985</td>
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### Program of the Course - first/second/third cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
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<td>University Goce Delcev</td>
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<td></td>
<td>Faculty of mechanical engineering</td>
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</table>
5. Cycle (first, second and third cycle) | First cycle
---|---
6. Academic year / semester | 1/2
7. Number of credits | 4
8. Professor (s) | Prof. Todor Delipetrov, PhD
9. Requirements for enrollment the Course | Student has enrolled current year
10. Purposes of the curriculum (competencies):
Students are introduced to the basic concepts and laws of electromagnetism, optics, nuclear and atomic physics
11. Content of the course program:
Heat: temperature, spread of bodies, state of gas, melting, boiling, vaporization.
Electrostatics: Coulomb’s law, electrical work and power of the electric current, Joule’s Law, Ohm’s law, thermal phenomena, magnetic permeability and susceptibility. AC: effective value of alternating current, power of alternating current, electrical oscillations. Geometrical optics: light rejection and image in the flat mirror, thin lens equation, optical instruments.
Physical optics: nature of light, laser, optical lattice. Atomic and nuclear physics: spectrum of hydrogen atom, quantum theory, radioactive radiation, detectors and protection, radioactive decay law
12. Learning methods:
Lectures, exercises (numerical and practical), papers and home learning
13. Total available time | 156 hours
14. Distribution of available time | 2 + 2 + 1 / per week
15. Forms of teaching / learning activities
| 15.1. lectures / theoretical - contact teaching, e-teaching | 2
| 15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work | 2
16. Other forms of activities
| 16.1. Project tasks |
| 16.2. Individual tasks | 1
| 16.3. Home learning |
17. Method of assessment
| 17.1. Tests / oral exams | 70 points
<p>| | | |</p>
<table>
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<td>17.2.</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
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<td>17.3.</td>
<td>Activity and participation</td>
<td>20 points</td>
</tr>
<tr>
<td>18.</td>
<td>Assessment Criteria (points / score)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td></td>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
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<td>71 to 80 points</td>
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<td></td>
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<td>10 (ten) (A)</td>
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<tr>
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<td>60% success from all activities before exam i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises</td>
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<td>20.</td>
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<td>Macedonian</td>
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<tr>
<td>21.</td>
<td>Method of monitoring the quality of teaching</td>
<td>Self-evaluation</td>
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<tr>
<td>22.</td>
<td>Literature</td>
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<tr>
<td></td>
<td>1.</td>
<td>M. Delipetrev</td>
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<td></td>
<td></td>
<td>B. Doneva</td>
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<tr>
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<td>1.</td>
<td>Z. Stojanov</td>
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<tr>
<td>Annex No.3</td>
<td>Program of the course—first cycle studies</td>
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<tr>
<td>------------</td>
<td>------------------------------------------</td>
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<tr>
<td>1. Title of the Course</td>
<td>Electrotechnics and Electronics</td>
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<td>2. Code</td>
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<td>3. Study program</td>
<td>Production Engineering / Transport, Organization and Logistics</td>
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<td>4. Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering -Vinica</td>
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<tr>
<td>5. Cycle (first, second, or third study cycle)</td>
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<tr>
<td>6. Academic year / semester</td>
<td>1st / 1st</td>
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<td>7. Number of EKTS credits</td>
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<td>8. Professor (s)</td>
<td>Roman Golubovski, Assistant Professor</td>
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<tr>
<td>9. Requirements for enrollment of the course</td>
<td>enrolled 1st semester</td>
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<tr>
<td>10. Purposes of the curriculum (competencies):</td>
<td>Introduction to basic principles of electrotechnics and electronics.</td>
<td></td>
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<tr>
<td>11. Contents of the course program:</td>
<td></td>
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<tr>
<td>1. Electric Current - Intensity, Current Field, Density</td>
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</tr>
<tr>
<td>2. Electric Voltage and Potential</td>
<td></td>
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<td>3. Basic Laws - Joule's, Ohm's, I &amp; II Kirchhoff's</td>
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<tr>
<td>4. Magnetic Flux, Magnetic Field and Magnetism</td>
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<td>5. Magnetic Induction, Ampere's Law and Magnetic Circuit</td>
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<td>6. Electrical Measurements</td>
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<td>7. Semiconductors</td>
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<td>10. MOSFET Transistors</td>
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<td>11. Thyristors</td>
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<td>12. Operational Amplifiers</td>
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</tr>
<tr>
<td>12. Learning methods: Lectures, numerical exercises, individual and team projects, homework.</td>
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<td></td>
</tr>
</tbody>
</table>
13. Total available time
   120

14. Distribution of available time
   2+1+1

15. Forms of teaching / learning activities
   15.1. lectures / theoretical - contact teaching, e-teaching
       2
   15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work
       1

16. Other forms of studying activities
   16.1. Project tasks
   16.2. Individual tasks
   16.3. Home learning

17. Method of assessment
   17.1. Tests / oral exams
       70 points
   17.2. Seminars (paper / project - presentation: written and/or oral)
       10 points
   17.3. Activity and participation
       20 points

18. Assessment Criteria (points / score)
   Up 50 points
   51 to 60 points
   61 to 70 points
   71 to 80 points
   81 to 90 points
   91 to 100 points
   5 (five) (F)
   6 (six) (E)
   7 (seven) (D)
   8 (eight) (C)
   9 (nine) (B)
   10 (ten) (A)

19. Signature requirement and passing the final exam
   60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. Language of teaching / study
    Macedonian

21. Method of monitoring the quality of teaching
    Self-evaluation

22. Literature
   22.1. Required literature
       | Order | Author | Title | Publisher | Year

Annex No.3

Program of the Course - first cycle studies

1. **Title of the Course**
   - Casting technology

2. **Code**
   - 2MF101812

3. **Study Program**
   - Production engineering/
   - Transport Organization and Logistics

4. **Organizer of the study program (unit or institute, Faculty, department)**
   - University Goce Delcev-Stip
   - Faculty of mechanical engineering - Vinica

5. **Cycle (first, second and third cycle)**
   - First cycle

6. **Academic year / semester**
   - First / I semester

7. **Number of credits**
   - 4

8. **Professor (s)**
   - Slavco Cvetkov, PhD, Assistant Professor

9. **Requirements for enrollment the Course**
   - No

10. **Purposes of the curriculum (competencies):** At the end of the course, students will have competences obtained through the necessary fund of theoretical, methodological and applicative studying in the area of casting technology.

11. **Content of the course program:**
   1. Introduction to the casting
   2. Casting materials
   3. Casting metallurgy

---

**22.2 Additional Literature**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
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<tr>
<td>1.</td>
<td>M. Popnikolova-Radevska</td>
<td>Electrotechnics</td>
<td>TF, Bitola</td>
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<td>2.</td>
<td>M. Kamilovski</td>
<td>Electronics 1</td>
<td>UKIM, Skopje</td>
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**Order No.**

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<tr>
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<td>Electronics 1</td>
<td>UKIM, Skopje 2005</td>
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<td>4. Sand casting</td>
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<td>5. Centrifugal casting</td>
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<td>6. Precise casting</td>
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<td>7. Vacuum casting</td>
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<td>8. Casting under pressure</td>
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<td>9. Heaters for melting</td>
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<tr>
<td>10. Tools for casting</td>
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<td>11. Construction tools for casting</td>
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<td>12. Defects in casting</td>
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</table>

12. **Learning methods:**
- Teaching, exercises, projects assignment

13. **Total available time** 120

14. **Distribution of available time** 2 + 1 + 1 / per week

15. **Forms of teaching / learning activities**

15.1. **lectures / theoretical** - contact teaching, e-teaching

15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work

16. **Other forms of activities**

16.1. Project tasks / hours

16.2. Individual tasks 1 hours

16.3. Home learning / hours

17. **Method of assessment**

17.1. **Tests / oral exams** 70 points

17.2. **Seminars (paper / project - presentation: written and/or oral)** 10 points

17.3. **Activity and participation** 20 points

18. **Assessment Criteria (points / score)**

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Score</th>
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<tr>
<td>up 50 points</td>
<td>5 (five) (F)</td>
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<tr>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
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<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
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</tbody>
</table>
### 19. Signature requirement and passing the final exam

60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

### 20. Language of teaching / study

Macedonian

### 21. Method of monitoring the quality of teaching

Self-evaluation

### 22. Literature

#### 22.1. Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
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<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Zoran Anisic</td>
<td>Production technologies</td>
<td>Visa Tehnicka Skola</td>
<td>2003</td>
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#### 22.2. Additional literature

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### Annex No.3

Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>1.</th>
<th>Title of the Course</th>
<th>Mathematics II</th>
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<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2FI100412</td>
</tr>
<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production Engineering / Transport, Organization and Logistics</td>
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</tbody>
</table>
4. **Organizer of the study program (unit or institute, Faculty, department)**
   - University Goce Delcev-Stip
   - Faculty of mechanical engineering - Vinica

5. **Cycle (first, second and third cycle)**
   - First cycle

6. **Academic year / semester**
   - First/II

7. **Number of credits**
   - 8

8. **Professor (s)**
   - Prof. Martin Lukarevski PhD /
   - Prof. Jordan Zivanovik PhD

9. **Requirements for enrollment the Course**
   - Enrollment of the first cycle study program

10. **Purposes of the curriculum (competencies):**
    - Knowledge and understanding of the basic mathematical concepts and theories, knowledge of ICT in mathematics, flexible use of knowledge in practice.

11. **Content of the course program:**
    - **13. The concept of Integral Calculus:** Indefinite integral – integration by substitution and integration by parts, fundamental integration formulas, Definite integral-concept, properties and applications.
    - **15. Multivariate Calculus:** definition, properties and graphics of functions with several variables; Partial derivatives; Maximum and minimum values; The total differential.
    - **16. Multiple integrals.**
    - **17. Introduction of differential equations:** Terminology and notation; A first-order differential equation for the exponential function; First-order linear differential equations and other types of first-order differential equations.

12. **Learning methods:**
    - Lectures,
    - e-learning,
    - individual and team projects
    - Consultations.

13. **Total available time**
   - 216

14. **Distribution of available time**
   - 3+2+2 / per week

15. **Forms of teaching / learning activities**
   - 15.1. lectures / theoretical - contact teaching, 3
| 15.2. | e-teaching theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 |
| 16. | Other forms of activities | 
| 16.1. | Project tasks | 1 hours |
| 16.2. | Individual tasks | 1 hours |
| 16.3. | Home learning | hours |
| 17. | Method of assessment | 
| 17.1. | Tests / oral exams | 70 points |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. | Activity and participation | 20 points |
| 18. | Assessment Criteria (points / score) | up 50 points |
| | | 5(five) (F) |
| | | 6(six) (E) |
| | | 7 (seven) (D) |
| | | 8 (eight) (C) |
| | | 9 (nine) (B) |
| | | 10 (ten) (A) |
| 19. | Signature requirement and passing the final exam | 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions |
| 20. | Language of teaching / study | Macedonian |
| 21. | Method of monitoring the quality of teaching | Self-evaluation |

| 22. | Literature | 
| 22.1. | Required literature | 
| No. | Author | Title | Publisher | Year |
Annex No.3

Program of the Course - first cycle studies

1. Title of the Course
   Engineering graphics

2. Code
   2FP100912

3. Study Program
   Production Engineering / Transport, Organization and Logistics

4. Organizer of the study program (unit or institute, Faculty, department)
   University Goce Delcev-Stip
   Faculty of mechanical engineering - Vinica

5. Cycle (first, second and third cycle)
   First cycle

6. Academic year / semester
   First / second semester

7. Number of credits
   6

8. Professor (s)
   Assi. Prof. Slavco Cvetkov, Ph.D.

9. Requirements for enrollment the Course
   None

10. Purposes of the curriculum (competencies):
    Training in drawing and reading technical drawings of machine parts. Training in drawing machine parts in the program package Auto CAD.

Additional literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Nikita Sekutkovski</td>
<td>Matematicka analiza 1</td>
<td>Prosvetno delo - Skopje</td>
<td>2008</td>
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<td>2.</td>
<td>Boro Piperevski</td>
<td>Matematika 2</td>
<td>FEIT - Skopje</td>
<td>2008</td>
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<td>3.</td>
<td>Tatjana Atanasova Pacemska</td>
<td>Matematika 2</td>
<td>Avtorizirani predavanja</td>
<td>2011</td>
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</table>
11. **Content of the course program:**


12. **Learning methods:**

   Lectures, exercises, individual works, home learning, consultations.

13. **Total available time**

   156 hours

14. **Distribution of available time**

   2+2+1 / per week

| 15. **Forms of teaching / learning activities** | 15.1. lectures / theoretical - contact teaching, e-teaching | 2 hours |
|                                             | 15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 hours |

16. **Other forms of activities**

   16.1. Project tasks

   16.2. Individual tasks

   16.3. Home learning

17. **Method of assessment**

   17.1. Tests / oral exams

   17.2. Seminars (paper / project - presentation: written and/or oral)

   17.3. Activity and participation

<p>| 17. <strong>Assessment Criteria (points / score)</strong> | up 50 points | 5(five) (F) |
|                                           | 51 to 60 points | 6(six) (E) |
|                                           | 61 to 70 points | 7(seven) (D) |
|                                           | 71 to 80 points | 8(eight) (C) |
|                                           | 81 to 90 points | 9(nine) (B) |</p>
<table>
<thead>
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<th>No.</th>
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<th>Points</th>
<th>Details</th>
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<td>91 to 100 points</td>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
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<tr>
<td>20</td>
<td>Language of teaching / study</td>
<td>10 (ten) (A)</td>
<td>Macedonian</td>
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<td>21</td>
<td>Method of monitoring the quality of teaching</td>
<td></td>
<td>Self-evaluation</td>
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Annex No.3

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16.3. **Home learning**

17. **Method of assessment**

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18. **Assessment Criteria (points / score)**

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<td>from 51 to 60 points</td>
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<td>from 61 to 70 points</td>
<td>7 (seven) (D)</td>
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<tr>
<td>from 71 to 80 points</td>
<td>8 (eight) (C)</td>
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<tr>
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<td>9 (nine) (B)</td>
</tr>
<tr>
<td>from 91 to 100 points</td>
<td>10 (ten) (A)</td>
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</table>

19. **Signature requirement and passing the final exam**

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**

Macedonian

21. **Method of monitoring the quality of teaching**

Self-evaluation

22. **Literature**

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<td>22.1.</td>
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<td>Simeon Simeonov</td>
<td>Technical mechanics 1 (peer reviewed script)</td>
<td>UGD-Stip</td>
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<td></td>
<td>2.</td>
<td>Z. Petrevski, V. Gavrilovski, M. Mickovski</td>
<td>Tasks from Statics</td>
<td>Mechanical faculty Skopje</td>
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<td>10.</td>
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12. **Learning methods:**
   - Teaching, exercises, projects assignment

13. **Total available time**
   - 120

14. **Distribution of available time**
   - 2 + 1 + 1 / per week

15. **Forms of teaching / learning activities**

   15.1. Lectures / theoretical - contact teaching, e-teaching
   - 2

   15.2. Theoretical and practical exercises, e-exams, preparation of independent seminar work
   - 1

16. **Other forms of activities**

   16.1. Project tasks

   16.2. Individual tasks
   - 1 hour

   16.3. Home learning

17. **Method of assessment**

   17.1. Tests / oral exams
   - 70 points

   17.2. Seminars (paper / project - presentation: written and/or oral)
   - 10 points

   17.3. Activity and participation
   - 20 points
18. Assessment Criteria (points / score)

<table>
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<th>Points Range</th>
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</table>

19. Signature requirement and passing the final exam

60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. Language of teaching / study

Macedonian

21. Method of monitoring the quality of teaching

Self-evaluation

22. Literature

<table>
<thead>
<tr>
<th>Required literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional literature</th>
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<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Annex No.3
<table>
<thead>
<tr>
<th></th>
<th>Program of the Course - first cycle studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Title of the Course</strong></td>
</tr>
<tr>
<td>2.</td>
<td><strong>Code</strong></td>
</tr>
<tr>
<td>3.</td>
<td><strong>Study Program</strong></td>
</tr>
<tr>
<td>4.</td>
<td><strong>Organizer of the study program</strong> (unit or institute, Faculty, department)</td>
</tr>
<tr>
<td>5.</td>
<td><strong>Cycle (first, second and third cycle)</strong></td>
</tr>
<tr>
<td>6.</td>
<td><strong>Academic year / semester</strong></td>
</tr>
<tr>
<td>7.</td>
<td><strong>ECTS</strong></td>
</tr>
<tr>
<td>8.</td>
<td><strong>Professor (s)</strong></td>
</tr>
<tr>
<td>9.</td>
<td><strong>Requirements for enrollment the Course</strong></td>
</tr>
<tr>
<td>10.</td>
<td><strong>Purposes of the curriculum (competencies):</strong></td>
</tr>
<tr>
<td>11.</td>
<td><strong>Content of the course program:</strong></td>
</tr>
<tr>
<td>12.</td>
<td><strong>Learning methods:</strong></td>
</tr>
<tr>
<td>13.</td>
<td><strong>Total available time</strong></td>
</tr>
<tr>
<td>14.</td>
<td><strong>Distribution of available time</strong></td>
</tr>
<tr>
<td>15.</td>
<td><strong>Forms of teaching / learning activities</strong></td>
</tr>
<tr>
<td></td>
<td>15.1. lectures / theoretical - contact teaching, e-teaching</td>
</tr>
<tr>
<td></td>
<td>15.2. theoretical and practical exercises</td>
</tr>
</tbody>
</table>
### 16. Other forms of activities

| 16.1. Project tasks
| 16.2. Individual tasks 1
| 16.3. Home learning |

### 17. Method of assessment

| 17.1. Tests / oral exams | 70 points |
| 17.2. Seminars (paper/project - presentation: written and/or oral) | 10 points |
| 17.3. Activity and participation | 20 points |

### 18. Assessment Criteria (points / score)

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>0 to 50</td>
<td>F</td>
</tr>
<tr>
<td>51 to 60</td>
<td>E</td>
</tr>
<tr>
<td>61 to 70</td>
<td>D</td>
</tr>
<tr>
<td>71 to 80</td>
<td>C</td>
</tr>
<tr>
<td>81 to 90</td>
<td>B</td>
</tr>
<tr>
<td>91 to 100</td>
<td>A</td>
</tr>
</tbody>
</table>

### 19. Signature requirement and passing the final exam

- 60% success from all pre exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

### 20. Language of teaching / study

- Macedonian

### 21. Method of monitoring the quality of teaching

- Self-evaluation

### 22. Literature

<table>
<thead>
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### Program of the Course - first cycle studies

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<tr>
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<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
<td>Thermodynamics</td>
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<tr>
<td>2.</td>
<td>Code</td>
<td>2MF100312</td>
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<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production engineering / Transport, organization and logistics</td>
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</tbody>
</table>
| 4. | Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip  
Faculty of mechanical engineering - Vinica |
| 5. | Cycle (first, second and third cycle) | first cycle |
| 6. | Academic year / semester | 2/III |
| 7. | Number of credits | 8 |
| 8. | Professor (s) | Assistant Prof. Radomir Cvetanovski, PhD |
| 9. | Requirements for enrollment the Course | non |
| 10. | Purposes of the curriculum (competencies) | Introducing the values of condition and their changes, the basic gas laws, equation of condition of ideal gases, internal energy, entropy, heat diagram; humid air |
| 11. | Content of the course program: |  
1. Introductory terms and values of condition; Basic gas laws; Concept of ideal gas and equation of condition of an ideal gas; The main laws of thermodynamics; Specific heat capacity; Changes of condition of ideal gases;  
2. Circular process; Recoverable and irreversible processes; Entropy; Double phased fixtures; Real gases; Humid air; |
12. **Learning methods**: Lectures with presentations through slides, exercises, independent preparation and presentation of the project assignment

13. **Total available time**: 216

14. **Distribution of available time**: 3+2+2 / per week

15. **Forms of teaching / learning activities**
   - **15.1. Lectures / theoretical - contact teaching, e-teaching**
   - **15.2. Theoretical and practical exercises, e-exams, preparation of independent seminar work**

16. **Other forms of activities**
   - **16.1. Project tasks**: 1 hours
   - **16.2. Individual tasks**: 1 hours
   - **16.3. Home learning**: hours

17. **Method of assessment**
   - **17.1. Tests / oral exams**: 70 points
   - **17.2. Seminars (paper / project - presentation: written and/or oral)**: 10 points
   - **17.3. Activity and participation**: 20 points

18. **Assessment Criteria (points / score)**
   - up 50 points: 5 (five) (F)
   - 51 to 60 points: 6 (six) (E)
   - 61 to 70 points: 7 (seven) (D)
   - 71 to 80 points: 8 (eight) (C)
   - 81 to 90 points: 9 (nine) (B)
   - 91 to 100 points: 10 (ten) (A)

19. **Signature requirement and passing the final exam**: 60% from pre-exam activities or 42 points from the two tests, seminar papers, attendance of lectures and exercises

20. **Language of teaching / study**: Macedonian

21. **Method of monitoring the quality of teaching**: Self-evaluation
Annex No.3

Program of the Course - first cycle studies

1. **Title of the Course**
   
   Strength of materials

2. **Code**
   
   2MF100412

3. **Study Program**
   
   Production Engineering / Transport, Organization and Logistics

4. **Organizer of the study program (unit or institute, Faculty, department)**
   
   University “Goce Delcev” - Stip.
   Faculty of Mechanical Engineering - Vinica

5. **Cycle (first, second and third cycle)**
   
   First cycle

6. **Academic year / semester**
   
   second / third

   7. **Number of credits**
   
   8

8. **Professor (s)**
   
   Assi. Prof. Simeon Simeonov, Ph.D

9. **Requirements for enrollment the Course**
   
   Attended course of technical mechanics 1

10. **Purposes of the curriculum (competencies):**
    
    Students are introduced to the moments of inertia, the types of stresses, dimensioning

11. **Content of the course program:**
Geometric features of planar sections: static moment, the moment of inertia, Steiner’s theorem; Tensile and compressive: axial stresses, dependence of the stress on the deformation - Hooke’s law. Plane stress condition; Shear and torsion; Bending: pure bending, bending from forces, strength calculation, uniform strength, major stresses at the bent beam; Elastic deformations at linear carriers; Statically indeterminate frameworks and carriers; Buckling: Euler and Tetmayer methods; Complex stresses: hypotheses of strength, obliquely bending; Complex stresses of tensile (compressive) and torsion, Complex stresses of tensile (compressive) and bending, Complex stresses of bending and torsion; Cylinder with a thick wall, Tank with thin wall; Strength of the material under dynamic load effect.

12. **Learning methods:**
Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.

13. **Total available time**
216 hours

14. **Distribution of available time**
3 +2 +2/ per week

15. **Forms of teaching / learning activities**

<table>
<thead>
<tr>
<th>15.1.</th>
<th>Lectures / theoretical - contact teaching, e-teaching</th>
<th>3 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.2.</td>
<td>Theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

16. **Other forms of activities**

<table>
<thead>
<tr>
<th>16.1.</th>
<th><strong>Project tasks</strong></th>
<th>1 hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.2.</td>
<td><strong>Individual tasks</strong></td>
<td>1 hour</td>
</tr>
<tr>
<td>16.3.</td>
<td><strong>Home learning</strong></td>
<td></td>
</tr>
</tbody>
</table>

17. **Method of assessment**

<table>
<thead>
<tr>
<th>17.1.</th>
<th>Tests / oral exams</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.2.</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
<td>10</td>
</tr>
<tr>
<td>17.3.</td>
<td>Activity and participation</td>
<td>20</td>
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18. **Assessment Criteria (points / score)**

<table>
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<tr>
<th>Points/Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>to 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td>from 51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td>from 61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>from 71 to 80 points</td>
<td>8 (eight) (C)</td>
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<tr>
<td>from 81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>from 91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>
19. **Signature requirement and passing the final exam**  
60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**  
Macedonian

21. **Method of monitoring the quality of teaching**  
Self-evaluation

22. **Literature**

### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Simeon Simeonov</td>
<td>Strength of material (script)</td>
<td>UGD-Stip</td>
<td>2011</td>
</tr>
<tr>
<td>3.</td>
<td>Lj.Trajkovska</td>
<td>Strength of material1</td>
<td>UKIM-Skopje</td>
<td>1993</td>
</tr>
</tbody>
</table>

### Additional literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lj.Trajkovska</td>
<td>Strength of material1 Collection tasks</td>
<td>UKIM-Skopje</td>
<td>1993</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Annex No.3**  
**Program of the Course - first cycle studies**

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Title of the Course</strong></td>
<td>Technical Mechanics 2(kinematics, dynamics, oscillations)</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Code</strong></td>
<td>2MF100612</td>
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<tr>
<td>3.</td>
<td><strong>Study Program</strong></td>
<td>Production Engineering /Transport, Organization and Logistics</td>
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<td>---</td>
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</tr>
<tr>
<td>4.</td>
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<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica</td>
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<td>Cycle (first, second and third cycle)</td>
<td>First cycle</td>
</tr>
<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>Second/ third</td>
</tr>
<tr>
<td>7.</td>
<td>Number of credits</td>
<td>6</td>
</tr>
<tr>
<td>8.</td>
<td>Professor(s)</td>
<td>Assi. Prof. Simeon Simeonov, Ph.D</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
<td>No</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
<td>Students are introduced to the movement of bodies, kinematics, dynamics and oscillations</td>
</tr>
<tr>
<td>11.</td>
<td>Content of the course program:</td>
<td></td>
</tr>
</tbody>
</table>
1. Introduction to kinematics, motion particle, velocity, acceleration;  
2. Types of motion: rectilinear, harmonic, circle, oblique angle shot;  
3. Kinematics of a rigid body, translational motion, rotational motion and plane motion;  
4. Composed motion of a rigid body, composition of translations, composition of rotations, composition of translation and rotation of a rigid body;  
5. Introduction to dynamics, dynamics of particle, differential equation of motion, types of motion;  
6. Laws of mechanics, impulse and work of force, amount of motion, kinetic energy, potential energy.... ;  
7. Dynamics of material systems, principles of mechanics: Lagrange-D’Alembert principle;  
8. Moments of inertia of a body,  
9. Rigid body dynamics, translation motion, rotation motion, plane motion;  
10. Oscillations general, free oscillations, Free damped (with resistance) oscillations, resistance of oscillations is proportional to the first degree of speed, force is constant;  
11. Forced oscillations without resistance, forced oscillations with resistance (damped);  
| 12. | Learning methods: | Lectures, Laboratory exercises, e-learning, individual and team projects, consultations. |
| 13. | Total available time | 156 hours |
| 14. | Distribution of available time | 2+2+1/ per week |
| 15. | Forms of teaching / learning activities | 15.1. lectures / theoretical - contact teaching, | 2 hours |
|15.2. | theoretical and practical exercises, e-exams, preparation of independent seminar work | 2hours |

### 16. Other forms of activities

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<tr>
<th>16.1. Project tasks</th>
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<tr>
<td>16.2. Individual tasks</td>
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### 17. Method of assessment

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<td>17.3. Activity and participation</td>
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### 18. Assessment Criteria (points / score)

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<th>Score Range</th>
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<tr>
<td>1.</td>
<td>S.Simeonov, Z.Sovreski</td>
<td>Technical mechanics 1(peer reviewed script)</td>
<td>UGD-Stip</td>
<td>2011</td>
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<tr>
<td>2.</td>
<td>E.Vetijakoska</td>
<td>Kinematics, dynamics, oscillations</td>
<td>Mechanical faculty-Skopje</td>
<td>2008</td>
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</table>
1. Title of the Course | Corrosion and corrosion protection
2. Code | 2MF102112
3. Study Program | Production engineering/Transport Organization and Logistics
4. Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip
5. Cycle (first, second and third cycle) | First cycle
6. Academic year / semester | Second/IIIsemester
7. Number of credits | 4
8. Professor (s) | Assi. Professor Slavco Cvetkov, PhD
9. Requirements for enrollment the Course | No
10. Purposes of the curriculum (competencies): At the end of the course, students will have competences obtained through the necessary fund of theoretical, methodological and applicative studying in the area of the materials corrosion and protection.
11. Content of the course program:
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1.</td>
<td>Introduction to the corrosion</td>
</tr>
<tr>
<td>2.</td>
<td>Corrosion in water solutions</td>
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<td>3.</td>
<td>Pitting corrosion</td>
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<td>4.</td>
<td>Contact corrosion</td>
</tr>
<tr>
<td>5.</td>
<td>Corrosion under mechanical factors</td>
</tr>
<tr>
<td>6.</td>
<td>Procedures for metals protection</td>
</tr>
<tr>
<td>7.</td>
<td>Protection with electrode potential</td>
</tr>
<tr>
<td>8.</td>
<td>Anode protection</td>
</tr>
<tr>
<td>9.</td>
<td>Protection with surface coating</td>
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<tr>
<td>10.</td>
<td>Electrochemical procedures for metals protection</td>
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<tr>
<td>11.</td>
<td>Coating metals protection</td>
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<td>12.</td>
<td>Constructive methods for metals protection</td>
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<td>12.</td>
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<td>-Teaching, exercises, projects assignment</td>
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<td>Method of monitoring the quality of teaching</td>
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<tr>
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<td>22.1. Required literature</td>
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<td>7. Number of credits</td>
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<tr>
<td>8. Professor (s)</td>
</tr>
<tr>
<td>9. Requirements for enrollment the Course</td>
</tr>
<tr>
<td>10. Purposes of the curriculum (competencies):</td>
</tr>
<tr>
<td>12. Learning methods:</td>
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<tr>
<td>13. Total available time</td>
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<tr>
<td>14. Distribution of available time</td>
</tr>
<tr>
<td>15. Forms of teaching / learning activities</td>
</tr>
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</table>
15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work

16. Other forms of activities
16.1. Project tasks
16.2. Individual tasks
16.3. Home learning

17. Method of assessment
17.1. Tests / oral exams
17.2. Seminars (paper / project - presentation: written and/or oral)
17.3. Activity and participation

18. Assessment Criteria (points / score)

<table>
<thead>
<tr>
<th>Points / Score</th>
<th>Description</th>
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<tbody>
<tr>
<td>up 50 points</td>
<td>5(five) (F)</td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6(six) (E)</td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

19. Signature requirement and passing the final exam
60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. Language of teaching / study
Macedonian

21. Method of monitoring the quality of teaching
Self-evaluation

22. Literature

<table>
<thead>
<tr>
<th>Required literature</th>
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<tbody>
<tr>
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### Annex No.3

**Program of the Course - first/second/third cycle studies**

<p>| | | | | |</p>
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<td>Assi. Prof. Dejan Mirakovski, PhD</td>
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<td>10.</td>
<td><strong>Purpose of the curriculum (competencies):</strong></td>
<td>Introduction to ergonomics and its principles, ergonomic design of the workspace, work place, characteristics of the work place and organization.</td>
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<td>– Lectures, exercises, individual tasks</td>
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<td>16.3. Home learning</td>
<td>hours</td>
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<td><strong>17. Method of assessment</strong></td>
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<td><strong>18. Assessment Criteria (points / score)</strong></td>
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<tr>
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<tr>
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<td><strong>19. Signature requirement and passing the final exam</strong></td>
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</table>
21. Method of monitoring the quality of teaching

Self-evaluation

22. Literature

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<thead>
<tr>
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<tbody>
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<td>No.</td>
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<td>1.</td>
<td>Prof. R. Polenakovik</td>
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Annex No.3

Program of the Course - first cycle studies

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<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>Code</td>
</tr>
<tr>
<td>3.</td>
<td>Study Program</td>
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| 4. | Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip  
Faculty of mechanical engineering -Vinica |
<p>| 5. | Cycle (first, second and third cycle) | First cycle |</p>
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<td>Assi. Prof. Misko Dzidrov, Ph.D</td>
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<td>1. Introduction to Management</td>
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<td>2. Problem solving and decision making</td>
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<td>3. Information and information systems</td>
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<td>4. Fundamentals of organizational communication</td>
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<td>5. Organizational communication - flows, networks and types</td>
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<td></td>
<td>6. Management by objectives and managerial function of planning</td>
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<td></td>
<td>7. Managerial function of organizing: division and grouping of work</td>
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<td></td>
<td>8. Managerial function of organization: coordination, management range and organizational design</td>
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<td></td>
<td>9. Organizational conflicts</td>
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<td></td>
<td>10. Staffing and Motivating</td>
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<td>11. Styles of leadership and types of managers</td>
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<tr>
<td></td>
<td>12. Systems and processes in controlling</td>
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<td>12</td>
<td><strong>Learning methods:</strong> Interactive teaching, exercises, individual and/or team work on projects, consultations and individual-study.</td>
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16. **Other forms of activities**

<table>
<thead>
<tr>
<th>Subheading</th>
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<tr>
<td>16.1. Project tasks</td>
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<td>16.2. Individual tasks</td>
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<td>16.3. Home learning</td>
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17. **Method of assessment**

<table>
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<tr>
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<th>Details</th>
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<tr>
<td>17.1. Tests / oral exams</td>
<td>70 points</td>
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<td>17.2. Seminars (paper/project - presentation: written and/or oral)</td>
<td>10 points</td>
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<td>17.3. Activity and participation</td>
<td>20 points</td>
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18. **Assessment Criteria (points / score)**

<table>
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<tr>
<th>Score Range</th>
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<tr>
<td>up to 50 points</td>
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<td>51 to 60 points</td>
<td>6 (E)</td>
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<tr>
<td>61 to 70 points</td>
<td>7 (D)</td>
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<tr>
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<td>8 (C)</td>
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<tr>
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</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (A)</td>
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</table>

19. **Signature requirement and passing the final exam**

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions.

20. **Language of teaching / study**

Macedonian

21. **Method of monitoring the quality of teaching**

Self-evaluation

22. **Literature**

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<tr>
<th>Required literature</th>
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<td><strong>Order</strong></td>
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### Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Code</th>
<th>Study Program</th>
<th>Organizer of the study program (unit or institute, Faculty, department)</th>
<th>Cycle (first, second and third cycle)</th>
<th>Academic year / semester</th>
<th>Number of credits</th>
<th>Professor (s)</th>
<th>Requirements for enrollment the Course</th>
<th>Purposes of the curriculum (competencies):</th>
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<tr>
<td>1.</td>
<td>Machine elements</td>
<td>2MF100712</td>
<td>Production Engineering /Transport, Organization and Logistics</td>
<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica</td>
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<td>second / fourth</td>
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<td>Assi. Prof. Ph.D Simeon Simeonov</td>
<td>Attended course of Strength of material</td>
<td>Students are introduced to the properties of machine elements, their dimensioning and constructing;</td>
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<td>2.</td>
<td>Management Principles Part 1</td>
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<td>Management Principles Handbook</td>
<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica</td>
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<td>second / fourth</td>
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<td>Assi. Prof. Ph.D Simeon Simeonov</td>
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<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica</td>
<td>First cycle</td>
<td>second / fourth</td>
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<td>Assi. Prof. Ph.D Simeon Simeonov</td>
<td>Attended course of Strength of material</td>
<td>Students are introduced to the properties of machine elements, their dimensioning and constructing;</td>
</tr>
</tbody>
</table>

**Content of the course program:**

- Elements for joining. Separable threaded fasteners, types, threaded transmitters, threaded fasteners, material, calculation; Wedges, serrated joints, pins. Inseparable fasteners (rivets, welded connections);

- Springs, flexible springs, spirally screw springs, construction and calculation; Bearing, ball bearing (rolling bearings), sleeve bearing (slide bearings), construction and calculation; Clutches, constantly engaged, engaged-disengaged manageable clutches, automatic clutches. Installation of pipes; Gears, cylindrical gears, construction and calculation. Conical gears,
### Learning methods:
Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.

### Total available time
216 hours

### Distribution of available time
3 +2 +2/ per week

### Forms of teaching / learning activities

| 15.1. | Lectures / theoretical - contact teaching, e-teaching | 3 hours |
| 15.2. | Theoretical and practical exercises, e-exams, preparation of independent seminar work | 2 hours |

### Other forms of activities

| 16.1. | Project tasks | 1 hour |
| 16.2. | Individual tasks | 1 hour |
| 16.3. | Home learning |

### Method of assessment

| 17.1. | Tests / oral exams | 70 |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 |
| 17.3. | Activity and participation | 20 |

### Assessment Criteria (points / score)

- to 50 points: 5 (five) (F)
- from 51 to 60 points: 6 (six) (E)
- from 61 to 70 points: 7 (seven) (D)
- from 71 to 80 points: 8 (eight) (C)
- from 81 to 90 points: 9 (nine) (B)
- from 91 to 100 points: 10 (ten) (A)

### Signature requirement and passing the final exam
60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

### Language of teaching / study
Macedonian

### Method of monitoring the quality of teaching
Self-evaluation
## Program of the Course - first cycle studies

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<tr>
<td>3.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering -Vinica</td>
</tr>
<tr>
<td>4.</td>
<td>Cycle (first, second and third cycle)</td>
<td>First cycle</td>
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<tr>
<td>5.</td>
<td>Academic year / semester</td>
<td>II/IV semester</td>
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<td>6.</td>
<td>Professor (s)</td>
<td>Assi. Prof. Radomir Cvetanoski, Ph.D</td>
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<tr>
<td>7.</td>
<td>Number of credits</td>
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</table>

### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Simeon Simeonov</td>
<td>Strength of material (script)</td>
<td>UGD-Stip</td>
<td>2011</td>
</tr>
<tr>
<td>2.</td>
<td>D.Stamboliev</td>
<td>Machine elements,1,2</td>
<td>UKIM Skopje</td>
<td>1975</td>
</tr>
<tr>
<td>3.</td>
<td>K.Trimcevski</td>
<td>Machine elements</td>
<td>Mechanical faculty - Skopje</td>
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</table>

### Additional literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>M. Ognjanovik</td>
<td>Mechanical elements</td>
<td>Mechanical faculty - Beograd</td>
<td>2008</td>
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<tr>
<td>2.</td>
<td>S.Simeonov</td>
<td>Mechanical elements -collection tasks</td>
<td>UGD-Stip</td>
<td>2011</td>
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<td>3.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Requirements for enrollment the Course</td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------</td>
<td>------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
<td>Introducing students to the mechanics of fluids, and training for calculations and practical application of the laws of fluid mechanics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Content of the course program:</td>
<td>Tasks and application of fluid mechanics; most important thermodynamic and physical properties of gases; most important thermodynamic and physical properties of liquids; Statics of fluids; Kinematics flow; ideal fluid dynamics; Some elementary flows ideal fluid through electrical flow; two-dimensional potential flow; convection viscous fluid; Methods of application of fluid mechanics (hydraulics); laminar flow through circular pipes; Hydraulic shock.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Learning methods:</td>
<td>Theoretical lectures, auditory exercises, lectures with presentations through slides, exercises, independent elaboration and defense of the project task</td>
<td></td>
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</tr>
<tr>
<td>13.</td>
<td>Total available time</td>
<td>156 hours</td>
<td></td>
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</tr>
<tr>
<td>14.</td>
<td>Distribution of available time</td>
<td>2+2+1 / per week</td>
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<tr>
<td>15.</td>
<td>Forms of teaching / learning activities</td>
<td>15.1. lectures / theoretical - contact teaching, e-teaching</td>
<td>2</td>
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<td></td>
<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
<td>2</td>
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<tr>
<td>16.</td>
<td>Other forms of activities</td>
<td>16.1. Project tasks</td>
<td>hours</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>16.2. Individual tasks</td>
<td>1 hours</td>
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<td></td>
<td></td>
<td>16.3. Home learning</td>
<td>hours</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Method of assessment</td>
<td>17.1. Tests / oral exams</td>
<td>70 points</td>
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<tr>
<td></td>
<td></td>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
<td>10 points</td>
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<td></td>
<td></td>
<td>17.3. Activity and participation</td>
<td>20 points</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Assessment Criteria (points / score)</td>
<td>up 50 points</td>
<td>5(five) (F)</td>
<td></td>
</tr>
<tr>
<td>Points Range</td>
<td>Grade (in parentheses)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51 to 60</td>
<td>6 (six) (E)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61 to 70</td>
<td>7 (seven) (D)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>71 to 80</td>
<td>8 (eight) (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>81 to 90</td>
<td>9 (nine) (B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>91 to 100</td>
<td>10 (ten) (A)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

19. **Signature requirement and passing the final exam**
60% of pre-exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. **Language of teaching / study**
Macedonian language

21. **Method of monitoring the quality of teaching**
Self-evaluation

### 22. Literature

#### 22.1. Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Frank White</td>
<td>Fluid Mechanics</td>
<td>Ars Lamina Skopje</td>
<td>2009</td>
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</table>

#### 22.2. Additional literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
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<td></td>
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</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
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</tbody>
</table>

### Annex No.3

**Program of the Course - first cycle studies**
<table>
<thead>
<tr>
<th></th>
<th>Title of the Course</th>
<th>Numerical methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2FP101512</td>
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<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production Engineering /Transport, Organization and Logistics</td>
</tr>
</tbody>
</table>
| 4. | Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip  
Faculty of mechanical engineering - Vinica |
| 5. | Cycle (first, second and third cycle) | First cycle |
| 6. | Academic year / semester            | Second/Fourth     |
| 7. | Number of credits                   | 6                 |
| 8. | Professor (s)                       | Prof. Blagoj Golomeov, Ph.D. |
| 9. | Requirements for enrollment the Course | No |
| 10. | Purposes of the curriculum (competencies): | Students are introduced to the basics of numerical mathematics. |
| 12. | Learning methods:                  | Lectures, e-learning, individual and team projects, consultations. |
| 13. | Total available time                | 156               |
| 14. | Distribution of available time      | 2+2+1 / per week  |
| 15. | Forms of teaching / learning activities | 15.1. lectures / theoretical - contact teaching, e-teaching  
15.2. theoretical and practical exercises, | 2 |
<table>
<thead>
<tr>
<th>16. Other forms of activities</th>
<th>16.1. Project tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.2. Individual tasks</td>
<td>1</td>
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<tr>
<td>16.3. Home learning</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>17. Method of assessment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>17.1. Tests / oral exams</td>
<td>70 points</td>
</tr>
<tr>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
<td>10 points</td>
</tr>
<tr>
<td>17.3. Activity and participation</td>
<td>20 points</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>18. Assessment Criteria (points / score)</th>
<th>up 50 points</th>
<th>5(five) (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>51 to 60 points</td>
<td>6(six) (E)</td>
</tr>
<tr>
<td></td>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td></td>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

| 19. Signature requirement and passing the final exam | 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions |

| 20. Language of teaching / study | Macedonian |

| 21. Method of monitoring the quality of teaching | Self-evaluation |

<table>
<thead>
<tr>
<th>22. Literature</th>
<th>Required literature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>22.1. Required literature</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
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</table>

| 22.2. Additional literature |
### Program of the Course - first/second/third cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Measurement and measuring instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2MF102212</td>
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<tr>
<td>3.</td>
<td>Study Program:</td>
<td>Production Engineering /Transport, Organization and Logistics</td>
</tr>
<tr>
<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty of mechanical engineering -Vinica</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second, third cycle)</td>
<td>First cycle</td>
</tr>
<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>Second / fourth semester</td>
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<tr>
<td>7.</td>
<td>Number of ECTS credits</td>
<td>4</td>
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<tr>
<td>8.</td>
<td>Professor (s)</td>
<td>Assi. Prof. Bratica Temelkoska, Ph.D</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrolment the Course</td>
<td>No</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
<td>Students are introduced to the types of measuring instruments and their application.</td>
</tr>
<tr>
<td>11.</td>
<td>Content of the course program:</td>
<td>Basic and general terms in metrology; Measurement and measurement concept, defined in terms of metrology; Measuring instruments; caliper rule and micrometers; comparators; yardsticks for measuring angles and cones; Methods for measurement and control coils; measuring machines; Measuring instruments based on optical measurements; pressure measurement. Temperature measurement; Instruments for measuring flow; Measuring force. Instruments for measuring deformations.</td>
</tr>
<tr>
<td>12.</td>
<td>Learning methods;</td>
<td></td>
</tr>
<tr>
<td>Section</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
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<tr>
<td>Theoretical lectures, laboratory exercises</td>
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<tr>
<td>13. Total available time</td>
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<td>14. Distribution of the available time</td>
<td>2+1+1</td>
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<td>15. Forms of teaching/ Learning activities</td>
<td>15.1 Lectures - theoretical contact teaching/e-teaching</td>
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<tr>
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<td>15.2 Theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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</tr>
<tr>
<td>16. Other forms of activities</td>
<td>16.1 Projects tasks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16.2 Individual tasks</td>
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</tr>
<tr>
<td></td>
<td>16.3 Home learning</td>
<td></td>
</tr>
<tr>
<td>17. Method of assessment</td>
<td>17.1 Tests / oral exams,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17.2 Seminars (paper /project - presentation ; written and /or oral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17.3 Activity and participacion</td>
<td></td>
</tr>
<tr>
<td>18. Assessment Criteria (points / score)</td>
<td>to 50 points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>from 51 to 60 points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>from 61 to 70 points</td>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>from 81 to 90 points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>from 91 to 100 points</td>
<td></td>
</tr>
<tr>
<td>19. Signature requirement and passing the final exam</td>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
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</tr>
<tr>
<td>20. Language of teaching/study</td>
<td>Macedonian</td>
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</tr>
<tr>
<td>21. Method of monitoring the quality of teaching</td>
<td>Self-evaluation</td>
<td></td>
</tr>
<tr>
<td>22. Literature</td>
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<tr>
<td>22.1 Required literature</td>
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<tr>
<td>Order</td>
<td>Author</td>
<td>Title</td>
</tr>
<tr>
<td>--------</td>
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</tbody>
</table>
Annex No.3

Program of the Course - first cycle studies

1. Title of the Course Heat transfer
2. Code MF102312
3. Study Program Production Engineering /Transport, Organization and Logistics
4. Organizer of the study program (unit or institute, Faculty, department) University Goce Delcev
   Faculty of Mechanical Engineering
5. Cycle (first, second and third cycle) first cycle
6. Academic year / semester II/IV semester 7. Number of credits 4
8. Professor (s) Assi. Prof. Radomir Cvetanoski, Ph.D
9. Requirements for enrollment the Course No
10. Purposes of the curriculum (competencies): Introduction to basic concepts of heat and temperature, the basic types of heat transfer, conduction, convection and radiation, heat transfer devices, Heat and types of Heat, efficiency and design.

No. | Author | Title | Publisher |
---|---|---|---|
1. | Bratica Temelkoska | Measurement and measuring instruments-textbook | University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica |
2. |
3. |

Additional literature

Order No. | Author | Title |
---|---|---|
1. |
2. |
3. |

Annex No.3

Program of the Course - first cycle studies

1. Title of the Course Heat transfer
2. Code MF102312
3. Study Program Production Engineering /Transport, Organization and Logistics
4. Organizer of the study program (unit or institute, Faculty, department) University Goce Delcev
   Faculty of Mechanical Engineering
5. Cycle (first, second and third cycle) first cycle
6. Academic year / semester II/IV semester 7. Number of credits 4
8. Professor (s) Assi. Prof. Radomir Cvetanoski, Ph.D
9. Requirements for enrollment the Course No
10. Purposes of the curriculum (competencies): Introduction to basic concepts of heat and temperature, the basic types of heat transfer, conduction, convection and radiation, heat transfer devices, Heat and types of Heat, efficiency and design.
11. **Content of the course program:**
   1. Temperature and heat; Transmission of heat; conduction heat transfer; Convective heat transfer; Radiation heat transfer; Heat;
   2. Efficiency of heat exchangers; Classification of heat exchangers; Tubular heat exchangers; Plate heat exchangers; Regenerative heat exchangers; Designing heat exchangers;

12. **Learning methods:**
   Lectures with presentations through slides, exercises, independent elaboration and defense of the project task

13. **Total available time**
   120 hours

14. **Distribution of available time**
   2 +1+1 / per week

15. **Forms of teaching / learning activities**

<table>
<thead>
<tr>
<th>15.1. Lectures / theoretical</th>
<th>15.1.</th>
<th>Lectures / theoretical - contact teaching, e-teaching</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>15.2. Theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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</table>

16. **Other forms of activities**

<table>
<thead>
<tr>
<th>16.1. Project tasks</th>
<th>Hours</th>
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<tbody>
<tr>
<td>16.2. Individual tasks</td>
<td>1 hours</td>
</tr>
<tr>
<td>16.3. Home learning</td>
<td>Hours</td>
</tr>
</tbody>
</table>

17. **Method of assessment**

<table>
<thead>
<tr>
<th>17.1. Tests / oral exams</th>
<th>70 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
<td>10 points</td>
</tr>
<tr>
<td>17.3. Activity and participation</td>
<td>20 points</td>
</tr>
</tbody>
</table>

18. **Assessment Criteria (points / score)**

   | Up to 50 points | 5 (five) (F) |
   | 51 to 60 points | 6 (six) (E) |
   | 61 to 70 points | 7 (seven) (D) |
   | 71 to 80 points | 8 (eight) (C) |
   | 81 to 90 points | 9 (nine) (B) |
   | 91 to 100 points | 10 (ten) (A) |
19. Signature requirement and passing the final exam

60% of pre-exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. Language of teaching / study

Macedonian language

21. Method of monitoring the quality of teaching

Self-evaluation

22. Literature

<table>
<thead>
<tr>
<th>Required literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
</tr>
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<table>
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<tr>
<th>Additional literature</th>
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<tbody>
<tr>
<td>No.</td>
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<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>3.</td>
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</tbody>
</table>

Annex No.3

Program of the Course - first cycle studies

<p>| 1. | Title of the Course | Thermo-technical machines |
| 2. | Code                | 2MF100912                 |
| 3. | Study Program       | Production engineering    |
| 4. | Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip Faculty of Mechanical Engineering -Vinica |
| 5. | Cycle (first, second and third cycle) | first cycle |
| 6. | Academic year / semester | 3/V |
| 7. | Number of credits | 8 |
| 8. | Professor (s) | Assistant Prof. Zlatko Sovreski, PhD |
| 9. | Requirements for enrollment the Course | none |
| 10. | Purposes of the curriculum (competencies): | Introduction to basic thermo technical machines, steam boilers, thermal turbines, steam turbines, heating appliances and air conditioning, cooling units, engine SVS. |
| 11. | Content of the course program: | 1. Types of energy; Energy sources; Steam boilers; Heat balance and heat losses; Coefficient of efficiency; Construction of steam boilers; Thermal turbines and plants. 2. Basic elements and classification of steam turbine units; Heating and cooling; ventilation plants; Refrigerating plants; Motor SVS; engine cycle in SVS. |
| 12. | Learning methods: | Lectures with presentations through slides, exercises, independent preparation and presentation of the project assignment |
| 13. | Total available time | 216 |
| 14. | Distribution of available time | 3+2+2 / per week |
| 15. | Forms of teaching / learning activities | 15.1. | lectures / theoretical - contact teaching, e-teaching |
| | | 15.2. | theoretical and practical exercises, e-exams, preparation of independent seminar work |
| 16. | Other forms of activities | 16.1. | Project tasks 1 hours |
| | | 16.2. | Individual tasks 1 hours |
| | | 16.3. | Home learning hours |
| 17. | Method of assessment | 17.1. | Tests / oral exams 70 points |</p>
<table>
<thead>
<tr>
<th>17.2.</th>
<th>Seminars (paper / project - presentation: written and/or oral)</th>
<th>10 points</th>
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<tbody>
<tr>
<td>17.3.</td>
<td>Activity and participation</td>
<td>20 points</td>
</tr>
<tr>
<td>18.</td>
<td>Assessment Criteria (points / score)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td></td>
<td>51 to 60 points</td>
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<td></td>
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<td>71 to 80 points</td>
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<tr>
<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
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<tr>
<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
<tr>
<td>19.</td>
<td>Signature requirement and passing the final exam</td>
<td>60% of pre-exam activities or 42 points from the two mid-term exams, seminar papers, attendance of lectures and exercises</td>
</tr>
<tr>
<td>20.</td>
<td>Language of teaching / study</td>
<td>Macedonian</td>
</tr>
<tr>
<td>21.</td>
<td>Method of monitoring the quality of teaching</td>
<td>Self-evaluation</td>
</tr>
</tbody>
</table>

### Literature

#### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Armenski Slave</td>
<td>Termodinamicki masini I uredi</td>
<td>UKIM</td>
<td>1995</td>
</tr>
<tr>
<td>2.</td>
<td></td>
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#### Additional literature

<table>
<thead>
<tr>
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<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Petrovski Ilija</td>
<td>Parni kotli</td>
<td>UKIM</td>
<td>2004</td>
</tr>
<tr>
<td>2.</td>
<td>Dimitrovski Mile</td>
<td>Motori SVS-teorija I sovremena oprema</td>
<td>UKIM</td>
<td>2001</td>
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<tr>
<td>3.</td>
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<tr>
<td>Annex No.3</td>
<td>Program of the Course - first cycle studies</td>
<td></td>
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<td>------------</td>
<td>-------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Title of the Course</td>
<td>Processing using cutting and plastic deformation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Code</td>
<td>2MF101012</td>
<td></td>
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</tr>
<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production Engineering</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 4. | Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip  
Faculty of Mechanical Engineering - Vinica  
Department of Production Engineering |
| 5. | Cycle (first, second and third cycle) | First cycle |
| 6. | Academic year / semester | Third year/ Fifth semester  
7. | Number of credits | 8 |
| 8. | Professor(s) | Assi. Prof. Slavco Cvetkov, Ph.D. |
| 9. | Requirements for enrollment the Course | None |
| 10. | Purposes of the curriculum (competencies): | Training and running processes by grinding, processing sheet with plastic deformation and processing technologies using spatial plastic deformation. |
| 11. | Content of the course program: | 1. Processing using grinding: Basics of the theory of processing using cutting. The quality of processing and economical cutting. Processing using cutting: production operations, the basic elements of the processed piece, cutting tool, resistance to cutting, speed cutting, sweep, the number of rotation, allowances for processing. Processing by milling, Saw logs, drilling, insertion, planning, grinding. Preparation of gears.  
2. Processing using plastic deformation: Elementary theoretical basis. Technology of processing metal sheets using cutting. |
| 12. | Learning methods: | Lectures, exercises, individual works, practical classes, home learning, consultations. |
| 13. | Total available time | 216 hours |
| 14. | Distribution of available time | 3+2+2 / per week |
| 15. | Forms of teaching / learning activities | 15.1. lectures / theoretical - contact teaching, e-teaching | 3 hours  
15.2. theoretical and practical exercises, | 2 hours |
| 16. | Other forms of activities | 16.1. | Project tasks | 1 hours |
|     |                           | 16.2. | Individual tasks |         |
|     |                           | 16.3. | Home learning   | 1 hours |

| 17. | Method of assessment |
| 17.1. | Tests / oral exams | 70 points |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. | Activity and participation | 20 points |

| 18. | Assessment Criteria (points / score) |
|     | up 50 points | 5 (five) (F) |
|     | 51 to 60 points | 6 (six) (E) |
|     | 61 to 70 points | 7 (seven) (D) |
|     | 71 to 80 points | 8 (eight) (C) |
|     | 81 to 90 points | 9 (nine) (B) |
|     | 91 to 100 points | 10 (ten) (A) |

| 19. | Signature requirement and passing the final exam |
|     | 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions |

| 20. | Language of teaching / study |
|     | Macedonian |

| 21. | Method of monitoring the quality of teaching |
|     | Self-evaluation |

| 22. | Literature |
|     | Required literature |

| 22.1. | No. | Author | Title | Publisher | Year |
|       | 1.   | Slavco Cvetkov | Processing using cutting and plastic deformation - script | UGD-Stip Mechanical faculty-Vinica | 2013 |
|       | 2.   |           |       |           |     |
|       | 3.   |           |       |           |     |
Annex No.3
Program of the Course - first cycle studies

1. Title of the Course  CAD technology
2. Code  2MF101112
3. Study Program  Production Engineering
4. Organizer of the study program (unit or institute, Faculty, department)  University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica
5. Cycle (first, second and third cycle)  First cycle
6. Academic year / semester  third / fifth  7. Number of credits  6
8. Professor (s)  Assi. Prof. Simeon Simeonov, Ph.D
9. Requirements for enrollment the Course  No
10. Purposes of the curriculum (competencies):
    Students are introduced to the basics and application of CAD technology in mechanical engineering
11. Content of the course program:

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Milisav Kalajdžić</td>
<td>Technology of machine construction</td>
<td>Mechanical faculty, Belgrade</td>
<td>2006</td>
</tr>
<tr>
<td>2.</td>
<td>Joko Stanić</td>
<td>Processing theory of processes</td>
<td>Mechanical faculty, Belgrade</td>
<td>1994</td>
</tr>
<tr>
<td>3.</td>
<td>J. Lazarev, V. Strezov</td>
<td>Machines and processing using deformation</td>
<td>Mechanical faculty, Skopje</td>
<td>2001</td>
</tr>
<tr>
<td>4.</td>
<td>D. M. Nikolić</td>
<td>Theory of processing II Theory of processing metals using deformation</td>
<td>Mechanical faculty, Belgrade</td>
<td>1999</td>
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<tr>
<td>5.</td>
<td>D. M. Nikolić</td>
<td>Theory of processing II Theory of processing metals using deformation</td>
<td>Mechanical faculty, Belgrade</td>
<td>1999</td>
</tr>
</tbody>
</table>

Additional literature

<table>
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<th>Publisher</th>
<th>Year</th>
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<td>Theory of processing II Theory of processing metals using deformation</td>
<td>Mechanical faculty, Belgrade</td>
<td>1999</td>
</tr>
</tbody>
</table>
Introduction to CAD technology, 2D documentation, Dimensions, Making templates, Primitives obtained by extruding, Primitives obtained by rotation, Primitives obtained by translation along the path, Modeling ribs, Sketched primitives modeling, Creating assemblies of primitives.

12. **Learning methods:**
Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.

13. **Total available time**
156 hours

14. **Distribution of available time**
2 +2 +1/ per week

15. **Forms of teaching / learning activities**

<table>
<thead>
<tr>
<th>15.1.</th>
<th>lectures / theoretical - contact teaching, e-teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.2.</td>
<td>theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
</tr>
<tr>
<td></td>
<td>22 hours</td>
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</table>

16. **Other forms of activities**

<table>
<thead>
<tr>
<th>16.1.</th>
<th>Project tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.2.</td>
<td>Individual tasks</td>
</tr>
<tr>
<td></td>
<td>1 hour</td>
</tr>
<tr>
<td>16.3.</td>
<td>Home learning</td>
</tr>
</tbody>
</table>

17. **Method of assessment**

<table>
<thead>
<tr>
<th>17.1.</th>
<th>Tests / oral exams</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.2.</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
</tr>
<tr>
<td>17.3.</td>
<td>Activity and participation</td>
</tr>
<tr>
<td></td>
<td>to 50 points</td>
</tr>
<tr>
<td></td>
<td>5(five) (F)</td>
</tr>
<tr>
<td></td>
<td>from 51 to 60 points</td>
</tr>
<tr>
<td></td>
<td>6(six) (E)</td>
</tr>
<tr>
<td></td>
<td>from 61 to 70 points</td>
</tr>
<tr>
<td></td>
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<td>8 (eight) (C)</td>
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<td></td>
<td>from 81 to 90 points</td>
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<td>9 (nine) (B)</td>
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<td></td>
<td>from 91 to 100 points</td>
</tr>
<tr>
<td></td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

18. **Assessment Criteria (points / score)**

|       | 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions |
|       | Macedonian |
21. Method of monitoring the quality of teaching | Self-evaluation

22. Literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Required literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>SolidWorks –software And a book</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>G. Devedzik</td>
<td>CAD/CAM technology</td>
<td>Mechanical faculty Kraguevac</td>
<td>2004</td>
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</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Additional literature</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
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<td>2004</td>
</tr>
</tbody>
</table>

Annex No.3

Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Sustainable energy systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2MF102412</td>
</tr>
<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production Engineering</td>
</tr>
<tr>
<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev-Stip Faculty of mechanical engineering -Vinica</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
<td>first cycle</td>
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<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>III/V semester</td>
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<tr>
<td>8.</td>
<td>Professor (s)</td>
<td>Assi. Prof. Radomir Cvetanoski, Ph.D</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
<td>No</td>
</tr>
</tbody>
</table>
### 10. Purposes of the curriculum (competencies)

Introduction to sustainable energy systems, solar energy, geothermal energy, biomass, wind energy.

### 11. Content of the course program:

1. Introduction; Classification of sustainable energy systems; Solar energy - features; Devices and application of solar energy for hot water; Devices and application of solar energy for electricity; General geothermal energy;
2. Application of geothermal energy; Energy from biomass - potential sources; obtaining fuel from biomass; devices for obtaining fuel from biomass; wind energy; wind turbines and their application

### 12. Learning methods:

Lectures with presentations through slides, exercises, independent elaboration and defense of the project task

### 13. Total available time

120 hours

### 14. Distribution of available time

2+1+1 / per week

### 15. Forms of teaching / learning activities

| 15.1. | Lectures / theoretical - contact teaching, e-teaching | 2 |
| 15.2. | Theoretical and practical exercises, e-exams, preparation of independent seminar work | 1 |

### 16. Other forms of activities

| 16.1. | Project tasks | hours |
| 16.2. | Individual tasks | 1 hours |
| 16.3. | Home learning | hours |

### 17. Method of assessment

| 17.1. | Tests / oral exams | 70 points |
| 17.2. | Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. | Activity and participation | 20 points |

### 18. Assessment Criteria (points / score)

- up 50 points: 5 (five) (F)
- 51 to 60 points: 6 (six) (E)
- 61 to 70 points: 7 (seven) (D)
| 19. | Signature requirement and passing the final exam | 71 to 80 points: 8 (eight) (C)  
|      |                                              | 81 to 90 points: 9 (nine) (B)  
|      |                                              | 91 to 100 points: 10 (ten) (A)  
| 20. | Language of teaching / study | 60% of pre-exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises  
| 21. | Method of monitoring the quality of teaching | Macedonian language  
| 22. | Literature | Self-evaluation  

**Required literature**

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>S. Armenski</td>
<td>Renewable energy sources</td>
<td>NIP Student comes Skopje</td>
<td>2007</td>
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<td>2.</td>
<td></td>
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</tr>
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**Additional literature**

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<tr>
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<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>G. Kanevce</td>
<td>Sustainable energy systems lectures</td>
<td>Bitola</td>
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<td>3.</td>
<td></td>
<td></td>
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**Annex No.3**

**Program of the Course - first cycle studies**

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Code</th>
<th>Study Program</th>
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<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
<td>Machinery for transport</td>
<td></td>
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<tr>
<td>2.</td>
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<td>3.</td>
<td>Study Program</td>
<td>Production Engineering</td>
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<td>----------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td><strong>Organizer of the study program (unit or institute, Faculty, department)</strong></td>
<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering -Vinica</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td><strong>Cycle (first, second and third cycle)</strong></td>
<td>First cycle</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td><strong>Academic year / semester</strong></td>
<td>third /fifth</td>
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<td>7.</td>
<td><strong>Number of credits</strong></td>
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<tr>
<td>8.</td>
<td><strong>Professor (s)</strong></td>
<td>Assi. Prof. Simeon Simeonov, Ph.D</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td><strong>Requirements for enrollment the Course</strong></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td><strong>Purposes of the curriculum (competencies):</strong></td>
<td>Students are introduced to the types of means of transportation, calculation and application.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td><strong>Content of the course program:</strong></td>
<td>Introduction; Machinery for transport with cyclic work: simple mechanisms, cranes and hoists; Cranes’ features: capacity, relative time of work; types of loads. Mechanisms of cranes; Resistances and power of cranes; Elements for carrying the load: ropes, chains, chain wheels, rope drums. Elements for holding the load; Brakes, elements for raising, clutches, safety devices, Elements for retention, lifts, skippers; Transportation vehicles: carts, tractors, forklifts; Machines for continuous transport, conveyors with traction components: Conveyor belts; Conveyors with: plates, harrow. Elevators; Machines without traction components: roller conveyors, oscillatory conveyors, screw conveyors, hydraulic and pneumatic conveyors.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td><strong>Learning methods:</strong></td>
<td>Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td><strong>Total available time</strong></td>
<td>120 hours</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td><strong>Distribution of available time</strong></td>
<td>2 +1 +1/ per week</td>
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<tr>
<td>15.</td>
<td><strong>Forms of teaching / learning activities</strong></td>
<td>2 hours</td>
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<tr>
<td>15.1.</td>
<td>lectures / theoretical - contact teaching,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.2.</td>
<td>theoretical and practical exercises,</td>
<td>1 hours</td>
<td></td>
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<tr>
<td></td>
<td>e-teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>e-exams, preparation of independent seminar work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td><strong>Other forms of activities</strong></td>
<td>Project tasks</td>
<td></td>
</tr>
<tr>
<td>16.1.</td>
<td></td>
<td>1 hour</td>
<td></td>
</tr>
<tr>
<td>16.2.</td>
<td>Individual tasks</td>
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<td></td>
</tr>
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<td>16.3.</td>
<td>Home learning</td>
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<td></td>
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<tr>
<td>17.</td>
<td><strong>Method of assessment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.1.</td>
<td>Tests / oral exams</td>
<td>70</td>
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<td>-------</td>
<td>-------------------</td>
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<tr>
<td>17.2.</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
<td>10</td>
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<tr>
<td>17.3.</td>
<td>Activity and participation</td>
<td>20</td>
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<table>
<thead>
<tr>
<th>18.</th>
<th>Assessment Criteria (points / score)</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>to 50 points</td>
<td>5 (five) (F)</td>
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<tr>
<td></td>
<td>from 51 to 60 points</td>
<td>6 (six) (E)</td>
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<td></td>
<td>from 61 to 70 points</td>
<td>7 (seven) (D)</td>
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<td></td>
<td>from 71 to 80 points</td>
<td>8 (eight) (C)</td>
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<tr>
<td></td>
<td>from 81 to 90 points</td>
<td>9 (nine) (B)</td>
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<tr>
<td></td>
<td>from 91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

| 19. | Signature requirement and passing the final exam | 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions |

| 20. | Language of teaching / study | Macedonian |

| 21. | Method of monitoring the quality of teaching | Self-evaluation |

| 22. | Literature | |

<table>
<thead>
<tr>
<th>Required literature</th>
<th></th>
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<tr>
<td>No.</td>
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<tr>
<td></td>
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</tr>
<tr>
<td>1.</td>
<td>S. Simeonov</td>
</tr>
<tr>
<td>2.</td>
<td>J. Jancevski</td>
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<tr>
<td>No.</td>
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<td></td>
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</tr>
<tr>
<td>1.</td>
<td>Sava Dedier</td>
</tr>
<tr>
<td>2.</td>
<td>Sotir Panovski</td>
</tr>
<tr>
<td>3.</td>
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</tr>
<tr>
<td>Annex No.3</td>
<td>Program of the Course - first cycle studies</td>
</tr>
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<td>------------------------------------------</td>
</tr>
<tr>
<td>1.</td>
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<td>Cycle (first, second and third cycle)</td>
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<td>Academic year / semester</td>
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<td>8.</td>
<td>Professor (s)</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
</tr>
<tr>
<td>11.</td>
<td>Contents of the course program:</td>
</tr>
<tr>
<td></td>
<td>1. Introduction to the economic methods applied in engineering</td>
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<tr>
<td></td>
<td>2. Decision-making methods</td>
</tr>
<tr>
<td></td>
<td>3. Studying of cash flow concepts</td>
</tr>
<tr>
<td></td>
<td>4. Rate of return, return of investments,</td>
</tr>
<tr>
<td></td>
<td>5. Financial indicators for profitability, effectiveness, efficiency,</td>
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<td>6. Cost analysis, revenue, profits,</td>
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<tr>
<td></td>
<td>7. Balance sheet and income statement</td>
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<tr>
<td></td>
<td>8. Studying of basic economic value analysis (present value, annual analysis, incremental analysis, cost/benefit analysis)</td>
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<tr>
<td></td>
<td>9. Methods for calculating of depreciation</td>
</tr>
<tr>
<td></td>
<td>10. Techniques for estimating of equipment replacement</td>
</tr>
<tr>
<td></td>
<td>11. Making investment decisions among project alternatives</td>
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</table>
### 12. Learning techniques for preparation of a business plan and feasibility study

**Learning methods:** Interactive teaching, exercises, individual and/or team work on projects, consultations and individual learning

<table>
<thead>
<tr>
<th>13. Total available time</th>
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<tr>
<td>14. Distribution of available time</td>
<td>2 + 1 + 1</td>
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<tr>
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<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<th>16. Other forms of activities</th>
<th>16.1. Project tasks</th>
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<td>16.2. Individual tasks</td>
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<td>16.3. Home learning</td>
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<table>
<thead>
<tr>
<th>17. Method of assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.1. Tests / oral exams</td>
</tr>
<tr>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
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<tr>
<td>17.3. Activity and participation</td>
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<table>
<thead>
<tr>
<th>18. Assessment Criteria (points / score)</th>
<th>to 50 points</th>
<th>5(five) (F)</th>
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<tbody>
<tr>
<td></td>
<td>from 51 to 60 points</td>
<td>6(six) (E)</td>
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<tr>
<td></td>
<td>from 61 to 70 points</td>
<td>7 (seven) (D)</td>
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<tr>
<td></td>
<td>from 71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td></td>
<td>from 81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td></td>
<td>from 91 to 100 points</td>
<td>10 (ten) (A)</td>
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</table>

| 19. Signature requirement and passing the final exam | 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions |

<table>
<thead>
<tr>
<th>20. Language of teaching / study</th>
<th>Macedonian</th>
</tr>
</thead>
</table>

| 21. Method of monitoring the quality of teaching | Self-evaluation |
Annex No.3

Program of the Course - first cycle studies

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Title of the Course</td>
<td>Machines and tools for plastic processing</td>
</tr>
<tr>
<td>2.</td>
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<td>University Goce Delcev-Stip</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty of Mechanical Engineering - Vinica</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Production Engineering</td>
</tr>
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<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
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<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>Third / Sixth</td>
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<td>7.</td>
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Literature

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<td></td>
</tr>
<tr>
<td></td>
<td>Order No.</td>
<td>Author</td>
<td>Title</td>
</tr>
<tr>
<td>1.</td>
<td>V. Gecevska</td>
<td>Engineering Economics</td>
<td>Faculty of Mechanical Engineering, UKIM, Skopje</td>
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<tr>
<td>2.</td>
<td>D. Bojadzhioski</td>
<td>Enterprise Economics</td>
<td>Economic Faculty Skopje</td>
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<td>Order No.</td>
<td>Author</td>
<td>Title</td>
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<td>semester</td>
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</tr>
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<td>8.</td>
<td><strong>Professor(s)</strong></td>
<td>Assi. Prof. Slavco Cvetkov, Ph.D</td>
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<tr>
<td>9.</td>
<td><strong>Requirements for enrollment the Course</strong></td>
<td>Passed exam of Processing using cutting and plastic deformation</td>
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<tr>
<td>10.</td>
<td><strong>Purposes of the curriculum (competencies):</strong></td>
<td>Training to use treatment processes of plastic deformation and processing machines as well as design and construction of tools for plastic deformation processing.</td>
<td></td>
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</table>
| 11. | **Content of the course program:** | 1. Machines for plastic processing. Machines for sheet metal processing, crank and hydraulic presses. Angle bending presses and crank scissors for cutting sheet metal. Hammers and forging presses.  
| 12. | **Learning methods:** | Lectures, exercises, individual work, practical classes, home learning, consultations. |
| 13. | **Total available time** | 216 hours |
| 14. | **Distribution of available time** | 3+2+2 / per week |
| 15. | **Forms of teaching / learning activities** | 15.1. lectures / theoretical - contact teaching, e-teaching  
15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work |
| 16. | **Other forms of activities** | 16.1. Project tasks  
16.2. Individual tasks  
16.3. Home learning |
<p>| 17. | <strong>Method of assessment</strong> | 17.1. Tests / oral exams 70 points |</p>
<table>
<thead>
<tr>
<th>17.2.</th>
<th>Seminars (paper / project - presentation: written and/or oral)</th>
<th>10 points</th>
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<tr>
<td>17.3.</td>
<td>Activity and participation</td>
<td>20 points</td>
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<table>
<thead>
<tr>
<th>18.</th>
<th>Assessment Criteria (points / score)</th>
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<tbody>
<tr>
<td></td>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td></td>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td></td>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
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<td>71 to 80 points</td>
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<tr>
<td></td>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
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<tr>
<td></td>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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<table>
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<tr>
<th>19.</th>
<th>Signature requirement and passing the final exam</th>
<th>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending to lectures and discussions</th>
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<table>
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<tr>
<th>21.</th>
<th>Method of monitoring the quality of teaching</th>
<th>Self-evaluation</th>
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<table>
<thead>
<tr>
<th>22.</th>
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<td>---------------------</td>
<td>-----------------------------------------------------</td>
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<tr>
<td>1.</td>
<td>Slavco Cvetkov</td>
<td>Machines and tools for plastic processing - script</td>
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<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>1.</td>
<td>J, Lazarev, V, Strezov.</td>
<td>Machines and processing with deformation</td>
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### Program of the Course - first cycle studies

<p>| | | | |</p>
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<tbody>
<tr>
<td>1.</td>
<td><strong>Title of the Course</strong></td>
<td>Basics of internal combustion engines</td>
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<td><strong>Code</strong></td>
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<td>Production Engineering</td>
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<td>University “Goce Delcev”- Stip, Faculty of Mechanical Engineering - Vinica</td>
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<td>5.</td>
<td><strong>Cycle (first, second and third cycle)</strong></td>
<td>First cycle</td>
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</tr>
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<td>6.</td>
<td><strong>Academic year / semester</strong></td>
<td>third / fifth</td>
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<td>Assi. Prof. Zlatko V. Sovreski, Ph.D</td>
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<td>9.</td>
<td><strong>Requirements for enrollment the Course</strong></td>
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<td>10.</td>
<td><strong>Content of the course program:</strong></td>
<td>Introduction to basic Thermotechnical machines - steam boilers, thermal turbines, steam turbines, devices heating and air conditioning, refrigeration plants, internal combustion engines</td>
<td></td>
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</tbody>
</table>
| 11. | **Contents of the course program:** | Types of energy; energy sources; steam boilers; Heat balance and heat losses; Useful coefficient; construction of steam boilers; Thermal turbines and plants. 

Basic elements and classification steam turbines plants; Heating and cooling; ventilation plants; Refrigerating plants; Motor cycles in engines internal combustion |
| 12. | **Learning methods:** | Lectures, Laboratory exercises, e-learning, individual and team projects, consultations. |
| 13. | **Total available time** | 120 hours |
| 14. | **Distribution of available time** | 2+1+1 |
### Forms of teaching / learning activities

<table>
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<th>15.</th>
<th>Lectures / theoretical - contact teaching, e-teaching</th>
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<tbody>
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<td>15.1</td>
<td>theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<table>
<thead>
<tr>
<th>16.</th>
<th>Other forms of studying activities</th>
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<tr>
<td>16.1</td>
<td>Project tasks</td>
</tr>
<tr>
<td>16.2</td>
<td>Individual tasks</td>
</tr>
<tr>
<td>16.3</td>
<td>Home learning</td>
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### Method of assessment

<table>
<thead>
<tr>
<th>17.1</th>
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<td>17.2</td>
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<td>17.3</td>
<td>Activity and participation</td>
<td>20 points</td>
</tr>
</tbody>
</table>

### Assessment Criteria (points / score)

| up 50 points | 5(five) (F) |
| 51 to 60 points | 6(six) (E) |
| 61 to 70 points | 7 (seven) (D) |
| 71 to 80 points | 8 (eight) (C) |
| 81 to 90 points | 9 (nine) (B) |
| 91 to 100 points | 10 (ten) (A) |

### Signature requirement and passing the final exam

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

### Language of teaching / study

Macedonian

### Method of monitoring the quality of teaching

Self-evaluation

### Literature

<table>
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<tr>
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<th>Required literature</th>
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| | | | | | |
### Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Code</th>
<th>Study Program</th>
<th>Organizer of the study program (unit or institute, Faculty, department)</th>
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</table>
| 1.  | Metalcutting machines and devices | 2MF101312 | Production Engineering | University Goce Delcev-Štip  
Faculty of Mechanical Engineering - Vinica  
Department of Production Engineering |

### Additional literature

<table>
<thead>
<tr>
<th>Order No.</th>
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<tr>
<td>1.</td>
<td>I. Petreski</td>
<td>Steam turbines</td>
<td>University &quot;Ss. Cyril and Methodius &quot; Skopje</td>
<td>2004</td>
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<tr>
<td>2.</td>
<td>M. Dimitrovski</td>
<td>Engines internal combustion</td>
<td>University &quot;Ss. Cyril and Methodius &quot; Skopje</td>
<td>2001</td>
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<td><strong>Cycle (first, second and third cycle)</strong></td>
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<td>6.</td>
<td><strong>Academic year / semester</strong></td>
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<td>8.</td>
<td><strong>Professor (s)</strong></td>
<td>Assi. Prof. Slavco Cvetkov, Ph.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td><strong>Requirements for enrollment the Course</strong></td>
<td>Passed exam of Processing using cutting and plastic deformation</td>
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<td>10.</td>
<td><strong>Purposes of the curriculum (competencies):</strong></td>
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</tr>
<tr>
<td></td>
<td>Training to use processing machines for cutting (metalmilling machines) as well as design and construction of devices for metalcutting machines</td>
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</tr>
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<td>11.</td>
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<tr>
<td></td>
<td><strong>1. Metalcutting machines.</strong> Basic parts (construction) of the metalcutting machines.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Lathes, milling machines, cutting machines, boring mills, grinding machines (grinders), insertion machines, mill drill, machines for fine processing and processing centers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>2. Devices of metalcutting machines.</strong> Constriction devices, based on processed parts, elements and constriction mechanism, components. Universal assembling devices. Performing special construction of devices for metalcutting machines.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12.</td>
<td><strong>Learning methods:</strong></td>
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<td>Lectures, exercises, individual work, practical classes, home learning, consultations.</td>
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<td>2 hours</td>
<td></td>
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<tr>
<td></td>
<td><strong>15.2.</strong> theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
<td>2 hours</td>
<td></td>
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</tr>
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<td><strong>Other forms of activities</strong></td>
<td><strong>16.1.</strong> Project tasks</td>
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<td></td>
</tr>
<tr>
<td></td>
<td><strong>16.2.</strong> Individual tasks</td>
<td>1 hours</td>
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<td><strong>16.3.</strong> Home learning</td>
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<td>17.</td>
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<td></td>
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<tr>
<td>18.</td>
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<td>up 50 points</td>
<td>5 (five) (F)</td>
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<tr>
<td></td>
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<td>6 (six) (E)</td>
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<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
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<td>10 (ten) (A)</td>
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<td>21.</td>
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<td>Self-evaluation</td>
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<td>Program of the Course - first cycle studies</td>
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<td>11.</td>
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<td>12.</td>
<td>Learning methods:</td>
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<td>14.</td>
<td>Distribution of available time</td>
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<td>15.</td>
<td>Forms of teaching / learning activities</td>
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</table>
16. **Other forms of activities**

<p>| | |</p>
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<tr>
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<tbody>
<tr>
<td>16.1.</td>
<td><strong>Project tasks</strong></td>
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<tr>
<td>16.2.</td>
<td><strong>Individual tasks</strong></td>
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<tr>
<td>16.3.</td>
<td><strong>Home learning</strong></td>
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</table>

17. **Method of assessment**

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>17.1.</td>
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<td>17.2.</td>
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<td>10 points</td>
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<td>Activity and participation</td>
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18. **Assessment Criteria (points / score)**

<table>
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<tr>
<th>Points</th>
<th>Score</th>
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<tbody>
<tr>
<td>up 50 points</td>
<td>5(five) (F)</td>
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<tr>
<td>51 to 60 points</td>
<td>6(six) (E)</td>
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<tr>
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</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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</tbody>
</table>

19. **Signature requirement and passing the final exam**

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**

Macedonian

21. **Method of monitoring the quality of teaching**

Self-evaluation

22. **Literature**

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<td></td>
<td>Order No.</td>
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<tr>
<td>1.</td>
<td>Godfrej C.Onvubolu</td>
<td>Mechatronics - Principles and Applications</td>
<td>United Kingdom</td>
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2. |

3. |
### Program of the Course - first cycle studies

<p>| 1. | Title of the Course | Waste management |
| 2. | Code | 2MF107212 |
| 3. | Study Program | Production Engineering |
| 4. | Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip Faculty of mechanical engineering -Vinica |
| 5. | Cycle (first, second and third cycle) | 1st cycle |
| 6. | Academic year / semester | 3rd / 6th |
| 7. | Number of credits | 4 |
| 8. | Professor (s) | Prof. Orce Spasovski, PhD |
| 9. | Requirements for enrollment the Course | none |
| 10. | Purposes of the curriculum (competencies): Students are introduced to the characteristics of the waste collection, transportation and recycling. |
| 11. | Content of the course program: | Sources, properties and types of solid waste; Determination of physical, chemical and biological characteristics of the solid waste; Factors affecting the occurrence of solid waste; Waste collection and transport, handling, storage and solid waste compression; Dangerous radioactive wastes; medical waste; Solid waste recycling; Biological Treatment of solid Waste; thermal treatment of waste; burning and the use of heat, gasification and plasma |</p>
<table>
<thead>
<tr>
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<td>12.</td>
<td><strong>Learning methods</strong>: Lecturing, exercises</td>
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<td>13.</td>
<td><strong>Total available time</strong>: 120</td>
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<td>14.</td>
<td><strong>Distribution of available time</strong>: 2+2+1 / per week</td>
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<td>15.</td>
<td><strong>Forms of teaching / learning activities</strong></td>
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<td>15.2.</td>
<td>Theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<td>16.</td>
<td><strong>Other forms of studying activities</strong></td>
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<tr>
<td>16.1.</td>
<td>Project tasks</td>
<td>hours</td>
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<tr>
<td>16.2.</td>
<td>Individual tasks</td>
<td>1 hours</td>
</tr>
<tr>
<td>16.3.</td>
<td>Home learning</td>
<td>hours</td>
</tr>
<tr>
<td>17.</td>
<td><strong>Method of assessment</strong></td>
<td></td>
</tr>
<tr>
<td>17.1.</td>
<td>Tests / oral exams</td>
<td>70 points</td>
</tr>
<tr>
<td>17.2.</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
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<td>17.3.</td>
<td>Activity and participation</td>
<td>20 points</td>
</tr>
<tr>
<td>18.</td>
<td><strong>Assessment Criteria (points / score)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td></td>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
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<tr>
<td></td>
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<td>19.</td>
<td><strong>Signature requirement and passing the final exam</strong>: 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td><strong>Language of teaching / study</strong>: Macedonian</td>
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<tr>
<td>21.</td>
<td><strong>Method of monitoring the quality of teaching</strong>: Self-evaluation</td>
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</table>
Program of the Course - first cycle studies

1. Title of the Course: Welding and assembly
2. Code: 2MF101412
3. Study Program: Production Engineering
4. Organizer of the study program (unit or institute, Faculty, department):
   University “Goce Delcev”- Stip.
   Faculty of Mechanical Engineering - Vinica
5. Cycle (first, second and third cycle): First cycle
6. Academic year / semester: third/sixth
7. Number of ECTS credits: 6
8. Professor (s): Assi. Prof. Bratica Temelkoska, Ph.D
9. Requirements for enrollment the Course: No
10. Purposes of the curriculum (competencies):
    Students are introduced to the types of welding, technologies and their application
11. **Content of the course program:**

   Introduction to Welding Technology; Gas welding; arc welding; gas arc welding protection; arc welding; resistance welding; Special welding procedures; Related welding procedures: build-up welding, brazing, soldering; Procedures of merging new materials: welding composites, ceramic materials and plastics; Welding other metal materials. Structure and properties of metals. Structure of the welded junction; corrosion of welded junction. Heat treatment of the base fabric and welded junction; Installation of welded constructions.

12. **Learning methods:**

   Theory, practical teaching and auditory exercises

13. **Total available time**

   156 hours

14. **Distribution of available time**

   2+2+1

15. **Forms of teaching / learning activities**

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<table>
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<tr>
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<td>theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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16. **Other forms of activities**

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<tbody>
<tr>
<td>16.1</td>
<td>Project tasks</td>
</tr>
<tr>
<td>16.2</td>
<td>Individual tasks</td>
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<td>16.3</td>
<td>Home learning</td>
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17. **Method of assessment**

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<td>Activity and participation</td>
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18. **Assessment Criteria (points / score)**

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<th>Score Range</th>
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<tr>
<td>up 50 points</td>
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<td>51 to 60 points</td>
<td>6 (six) (E)</td>
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<td>Language of teaching / study</td>
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### Literature

#### Required literature

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<tr>
<td>1.</td>
<td>B.Temelkoska</td>
<td>Merging materials-textbook</td>
<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica</td>
<td>2010</td>
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#### Additional literature

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### Annex No.3

Program of the Course - first cycle studies

<p>| 1. | Title of the Course | Hydraulic machinery and components |</p>
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<td>5.</td>
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<td>Requirements for enrollment the Course</td>
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<td>10.</td>
<td>Purposes of the curriculum (competencies): Introduction to hydraulic machines and components, their characteristics, construction, and manner of application.</td>
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<td>11.</td>
<td>Content of the course program:</td>
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<td></td>
<td>1. Working fluids and their characteristics; Hydraulic volume machines. Gear pumps and hydraulic motors; Vane and radial piston pumps and hydraulic motors; Axial-priston pumps and hydraulic motors. Low-speed hydraulic motors; Hydraulic cylinders; Check and push valves; Hydraulic distributors; flow regulators. Proportional and servo hydraulics; Hydraulic accumulators and filters; Additional equipment and accessories for hydraulic systems; Tech connecting and bonding. Hydraulic aggregates; Designing of hydraulic systems.</td>
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<tr>
<td></td>
<td>2. Examples of systems with hydraulic machines and components; Selection and influence of working fluid operation on the hydraulic system; Calculation of fluid compressibility module; Calculation and selection of pump; Calculation and selection of hydraulic motor and cylinder; Construction and application of Grants and push valves; Construction and application of deployed valves; Calculation, selection and manner of installation of the hydraulic accumulator system; Calculation and design of hydraulic aggregate; Calculation of hydraulic systems; Performance of hydraulic systems.</td>
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<tr>
<td>12.</td>
<td>Learning methods:</td>
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<td>Lectures with presentations through slides, exercises, independent elaboration and defense of the project task</td>
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<td>Distribution of available time</td>
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### 15.2. Others forms of activities

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### 16. Method of assessment

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### 17. Assessment Criteria (points / score)

<table>
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<tr>
<th>Points Range</th>
<th>Score</th>
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<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
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</table>

### 18. Signature requirement and passing the final exam

60% success from all pre-exma activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

### 19. Language of teaching / study

Macedonian language

### 20. Method of monitoring the quality of teaching

Self-evaluation

### 22. Literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
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<th>Year</th>
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<tr>
<td>1.</td>
<td>Zvonimir Kostic</td>
<td>Hydraulic machinery and equipment-script</td>
<td>Mechanical Engineering - Skopje</td>
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**Annex No.3**

**Program of the Course - first cycle studies**

1. **Title of the Course**
   Heating, air conditioning and heat systems

2. **Code**
   2MF101612

3. **Study Program**
   Production Engineering

4. **Organizer of the study program (unit or institute, Faculty, department)**
   University "Goce Delcev" - Stip
   Faculty of Mechanical Engineering-Vinica

5. **Cycle (first, second and third cycle)**
   first cycle studies

6. **Academic year / semester**
   IV/VII semester

7. **Number of credits**
   8

8. **Professor(s)**
   Assi. Prof. Radomir Cvetanoski, Ph.D

9. **Requirements for enrollment the Course**
   No

10. **Purposes of the curriculum (competencies):** Operation and basic design principles of the elements of heating and air conditioning systems.

11. **Content of the course program:**

---

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
</table>

---
12. **Learning methods**: Lectures with presentations through slides, exercises, independent elaboration and defense of the project task

13. **Total available time** | 216 hours

14. **Distribution of available time** | 3+2+2 / per week

15. **Forms of teaching / learning activities**

| 15.1. lectures / theoretical | contact teaching, 3 | e-teaching |
| 15.2. theoretical and practical | exercises, 2 | e-exams, preparation of independent seminar work |

16. **Other forms of activities**

| 16.1. Project tasks | 1 hours |
| 16.2. Individual tasks | 1 hours |
| 16.3. Home learning | hours |

17. **Method of assessment**

| 17.1. Tests / oral exams | 70 points |
| 17.2. Seminars (paper / project - presentation: written and/or oral) | 10 points |
| 17.3. Activity and participation | 20 points |

18. **Assessment Criteria (points / score)**

| up 50 points | 5(five) (F) |
| 51 to 60 points | 6(six) (E) |
| 61 to 70 points | 7 (seven) (D) |
| 71 to 80 points | 8 (eight) (C) |
| 81 to 90 points | 9 (nine) (B) |
| 91 to 100 points | 10 (ten) (A) |

19. **Signature requirement and passing the final exam**

60% success from all pre-exam activities i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises

20. **Language of teaching / study**

Macedonian language

21. **Method of monitoring the quality of teaching**

Self-evaluation
### Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>1.</th>
<th>Title of the Course</th>
<th>Basics of automatic control</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2MF101712</td>
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<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production Engineering</td>
</tr>
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<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University Goce Delcev -Stip Faculty of Mechanical engineering, Vinica Department of Production Engineering</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
<td>First cycle</td>
</tr>
<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>fourth/seventh</td>
</tr>
<tr>
<td>8.</td>
<td>Professor (s)</td>
<td>Assi. Prof. Saso Gelev, Ph.D.</td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
<td>No</td>
</tr>
<tr>
<td>10.</td>
<td>Purposes of the curriculum (competencies):</td>
<td>Students are introduced to the basics of Automation and Automatic Control.</td>
</tr>
</tbody>
</table>
11. **Content of the course program:**
   1. Introduction. Introduction to the basic concepts of Automatic Control
   2. Mathematical models of physical systems
   3. Time turnouts. Linearization
   4. Laplace transformation and its application
   5. Stability of systems
   6. Presentation of systems with block diagrams
   7. Reviewing of specific examples
   8. Constant of the error. Sensitivity of the systems
   9. Analysis of linear systems with Nykvist method
   10. Analysis of linear systems with method of traces of roots. Analysis of second-order systems
   11. Synthesis of linear systems using the method of traces of roots

12. **Learning methods:**
   Lectures, e-learning, individual and team projects, consultations.

13. **Total available time**
    156

14. **Distribution of available time**
    2+2+1 / per week

15. **Forms of teaching / learning activities**
   15.1. lectures / theoretical - contact teaching, e-teaching
   15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work

16. **Other forms of activities**
   16.1. Project tasks
   16.2. Individual tasks
   16.3. Home learning

17. **Method of assessment**
   17.1. Tests / oral exams
   17.2. Seminars (paper / project - presentation: written and/or oral)
   17.3. Activity and participation

18. **Assessment Criteria (points / score)**
<table>
<thead>
<tr>
<th>Points</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>up 50</td>
<td>5 (five) (F)</td>
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<tr>
<td>51 to 60</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td>61 to 70</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>71 to 80</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>81 to 90</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>
19. **Signature requirement and passing the final exam**  
   60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**  
   Macedonian

21. **Method of monitoring the quality of teaching**  
   Self-evaluation

### 22. Literature

#### 22.1. Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
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#### 22.2. Additional literature

<table>
<thead>
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<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>V.Bulat, Z.Gavric</td>
<td>Automatic control</td>
<td>Faculty of Mechanical Engineering Belgrade</td>
<td>1981</td>
</tr>
</tbody>
</table>

### Annex No.3  
Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>1.</th>
<th>Title of the Course</th>
<th>Design of technological processes</th>
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<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2MF102712</td>
</tr>
<tr>
<td>3.</td>
<td>Study Program</td>
<td>Production Engineering</td>
</tr>
</tbody>
</table>
| 4.  | Organizer of the study program (unit or institute, Faculty, department) | University Goce Delcev-Stip  
Faculty of Mechanical Engineering - Vinica  
Department of Production Engineering |
| 5.  | Cycle (first, second and third cycle) | First cycle                      |
| 6.  | Academic year / semester | Fourth/ Seventh semester | 7. Number of credits | 4 |
| 8.  | Professor (s)       | Assi. Prof. Slavco Cvetkov,Ph.D   |
9. **Requirements for enrollment the Course**

1. Processing using cutting and plastic deformation,
2. Metalcutting machines and devices and
3. Machines and tools for plastic deformation

10. **Purposes of the curriculum (competencies):**

   Training for designing technological processes for processing metals using grinding

11. **Content of the course program:**

   Basics of design of technological processes (TP): Systems and processes in machine construction, forms of production and characteristics of the TP, technological preparation of production.

   Design of the TP: designing and designer’s tasks, basic cases, principles and methods for designing the TP.

   Conventional designing of the TP: designing of separate TP, content of the project, the technological analysis of the technical drawing and construction, starting material, drawing of starting materials, supplements and methods for defining them, choosing technological bases, defining the order of operations, designing the TP and control of quality, designing TP by types and groups.

   Automatic designing of the TP. Basics of automatic designing, systems and design of TP, mathematical models, technological unification, the iteration methods for designing the TP. Techno-economic assessment of the TP: Time needed for the execution of the process, time funds, defining the necessary number of processed systems (OS) and the number of workers, designing scheme for the preparation of the OS. Technological documentation.

12. **Learning methods:**

   Lectures, exercises, individual work, practical classes, home learning, consultations.

13. **Total available time**

   120 hours

14. **Distribution of available time**

   2+1+1 / per week

15. **Forms of teaching / learning activities**

   **15.1.** lectures / theoretical contact teaching, e-teaching 2 hours

   **15.2.** theoretical and practical exercises, e-exams, preparation of independent seminar work 1 hours

16. **Other forms of activities**

   **16.1.** Project tasks 1 hours

   **16.2.** Individual tasks

   **16.3.** Home learning
17. **Method of assessment**

<table>
<thead>
<tr>
<th>17.1.</th>
<th>Tests / oral exams</th>
<th>70 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.2.</td>
<td>Seminars (paper / project - presentation: written and/or oral)</td>
<td>10 points</td>
</tr>
<tr>
<td>17.3.</td>
<td>Activity and participation</td>
<td>20 points</td>
</tr>
</tbody>
</table>

18. **Assessment Criteria (points / score)**

- up 50 points: 5 (five) (F)
- 51 to 60 points: 6 (six) (E)
- 61 to 70 points: 7 (seven) (D)
- 71 to 80 points: 8 (eight) (C)
- 81 to 90 points: 9 (nine) (B)
- 91 to 100 points: 10 (ten) (A)

19. **Signature requirement and passing the final exam**

- 60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**

- Macedonian

21. **Method of monitoring the quality of teaching**

- Self-evaluation

22. **Literature**

<table>
<thead>
<tr>
<th>Required literature</th>
</tr>
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<tbody>
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<td>2.</td>
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<table>
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<th>Additional literature</th>
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<td>No.</td>
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<tr>
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</tr>
<tr>
<td>22.2.</td>
</tr>
<tr>
<td>Annex No.3</td>
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<tr>
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<tr>
<td>1.</td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<td>11.</td>
</tr>
<tr>
<td>12.</td>
</tr>
<tr>
<td>13.</td>
</tr>
<tr>
<td>14.</td>
</tr>
</tbody>
</table>


15. **Forms of teaching / learning activities**

15.1. lectures / theoretical - contact teaching, e-teaching 2 hours

15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work 1 hours

16. **Other forms of activities**

16.1. **Project tasks**

16.2. **Individual tasks** 1 hour

16.3. **Home learning**

17. **Method of assessment**

17.1. Tests / oral exams 70

17.2. Seminars (paper / project - presentation: written and/or oral) 10

17.3. Activity and participation 20

18. **Assessment Criteria (points / score)**

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Criteria Description</th>
<th>Points</th>
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<tbody>
<tr>
<td>to 50 points</td>
<td></td>
<td>5(five)(F)</td>
</tr>
<tr>
<td>from 51 to 60</td>
<td></td>
<td>6(six) (E)</td>
</tr>
<tr>
<td>from 61 to 70</td>
<td></td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>from 71 to 80</td>
<td></td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>from 81 to 90</td>
<td></td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>from 91 to 100</td>
<td></td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

19. **Signature requirement and passing the final exam**

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions

20. **Language of teaching / study**

Macedonian

21. **Method of monitoring the quality of teaching**

Self-evaluation

22. **Literature**

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>P. Bojanic, R. Puzovic</td>
<td>Production systems APT-language programming</td>
<td>Mechanical faculty Beograd</td>
<td>2010</td>
</tr>
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</table>
Annex No.3

Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>1. Title of the Course</th>
<th>Modelling and simulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Code</td>
<td>2MF102912</td>
</tr>
<tr>
<td>3. Study Program</td>
<td>Production Engineering</td>
</tr>
<tr>
<td>4. Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University “Goce Delcev”- Stip. Faculty of Mechanical Engineering - Vinica</td>
</tr>
<tr>
<td>5. Cycle (first, second and third cycle)</td>
<td>First cycle</td>
</tr>
<tr>
<td>6. Academic year / semester</td>
<td>fourth/ seventh</td>
</tr>
<tr>
<td>7. Number of credits</td>
<td>4</td>
</tr>
<tr>
<td>8. Professor (s)</td>
<td>Assi. Prof. Simeon Simeonov, Ph.D</td>
</tr>
<tr>
<td>9. Requirements for enrollment the Course</td>
<td>No</td>
</tr>
<tr>
<td>10. Purposes of the curriculum (competencies):</td>
<td>Students are introduced to the procedure of modelling and simulation</td>
</tr>
<tr>
<td>11. Content of the course program:</td>
<td></td>
</tr>
</tbody>
</table>

Additional literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Manic M Spasic D</td>
<td>Numerically controlled machines</td>
<td>Mechanical faculty - Nis</td>
<td>1999</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction; Models, creating a model, types of models; Types of simulations, principles and application areas; Random numbers; Verification of the model; Validation; Analysis of the results; technique of simulating;</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>12. Learning methods:</strong></td>
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</tr>
<tr>
<td>Lectures, Laboratory exercises, e-learning, individual and team projects, consultations.</td>
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<tr>
<td><strong>13. Total available time</strong></td>
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<td><strong>14. Distribution of available time</strong></td>
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<tr>
<td><strong>15. Forms of teaching / learning activities</strong></td>
<td><strong>15.1. lectures / theoretical - contact teaching, e-teaching</strong></td>
<td>2 hours</td>
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<td></td>
<td><strong>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</strong></td>
<td>1 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>16. Other forms of activities</strong></td>
<td><strong>16.1. Project tasks</strong></td>
<td></td>
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<tr>
<td></td>
<td><strong>16.2. Individual tasks</strong></td>
<td>1 hour</td>
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<td></td>
<td><strong>16.3. Home learning</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>17. Method of assessment</strong></td>
<td><strong>17.1. Tests / oral exams</strong></td>
<td>70</td>
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<td><strong>17.2. Seminars (paper / project - presentation: written and/or oral)</strong></td>
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<td><strong>17.3. Activity and participation</strong></td>
<td>20</td>
<td></td>
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</tr>
<tr>
<td><strong>18. Assessment Criteria (points / score)</strong></td>
<td>to 50 points</td>
<td>5(five)(F)</td>
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<td></td>
<td>from 51 to 60 points</td>
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<tr>
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<td>from 61 to 70 points</td>
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<td></td>
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<tr>
<td></td>
<td>from 81 to 90 points</td>
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<td></td>
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<td></td>
<td>from 91 to 100 points</td>
<td>10 (ten) (A)</td>
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<td><strong>19. Signature requirement and passing the final exam</strong></td>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
<td></td>
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<tr>
<td><strong>20. Language of teaching / study</strong></td>
<td>Macedonian</td>
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</table>
## Method of monitoring the quality of teaching

Self-evaluation

### Literature

#### Required literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>S. Simeonov</td>
<td>Industrial modelling (peer reviewed script)</td>
<td>UGD-Stip</td>
<td>2013</td>
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<tr>
<td>2.</td>
<td>S. Simeonov</td>
<td>Simulations of processes in mechanical engineering (peer reviewed script)</td>
<td>UGD-Stip</td>
<td>2013</td>
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#### Additional literature

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Title</th>
<th>Publisher</th>
<th>Year</th>
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<tbody>
<tr>
<td>1.</td>
<td>Christopher A. Chung</td>
<td>Simulation modelling handbook</td>
<td></td>
<td>2004</td>
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<tr>
<td>2.</td>
<td>Antic D., Donkovic B.</td>
<td>Modelling and simulation of dynamic systems</td>
<td>University in Nis</td>
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### Annex No.3 - Program of the Course - first cycle studies

<table>
<thead>
<tr>
<th>1.</th>
<th>Title of the Course</th>
<th>Industrial Ventilation</th>
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<tbody>
<tr>
<td>2.</td>
<td>Code</td>
<td>2MF103012</td>
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<td>3.</td>
<td>Study Program</td>
<td>Production Engineering</td>
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<td>4.</td>
<td>Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University &quot;Goce Delcev&quot; - Stip</td>
<td>Faculty of Mechanical Engineering-Vinica</td>
</tr>
<tr>
<td>5.</td>
<td>Cycle (first, second and third cycle)</td>
<td>First cycle</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Academic year / semester</td>
<td>IV/ VII semester</td>
<td>7. Number of credits</td>
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<tr>
<td>8.</td>
<td>Professor (s)</td>
<td>Assistant Professor Dejan Mirakovski, PhD</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Requirements for enrollment the Course</td>
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<tr>
<td></td>
<td>Purposes of the curriculum (competencies):</td>
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<tr>
<td>---</td>
<td>------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Introduction to the ventilation systems, design, calculation and regulation of ventilation systems</td>
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<table>
<thead>
<tr>
<th></th>
<th>Content of the course program:</th>
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<td>11.</td>
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<td>2. Ventilation Principles</td>
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<td>3. Natural Ventilation</td>
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<td>4. Artificial Ventilation</td>
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<td></td>
<td>5. Local ventilation systems</td>
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<tr>
<td></td>
<td>6. General Industrial Ventilation</td>
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<td>7. Microclimate conditions</td>
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<td>8. Gases in working environment</td>
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<td>9. Dust in working environment</td>
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<td></td>
<td>10. Air purification systems</td>
</tr>
<tr>
<td></td>
<td>11. Dimensioning of channels</td>
</tr>
<tr>
<td></td>
<td>12. Cooling and Drying</td>
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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>12.</td>
<td>- Lectures,</td>
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<tr>
<td></td>
<td>- theoretical and practical exercises,</td>
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<tr>
<td></td>
<td>- e-teaching,</td>
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<td>- seminar paper</td>
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<td>- consultation</td>
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<tr>
<td>15.</td>
<td>15.1. lectures / theoretical - contact teaching, e-teaching</td>
</tr>
<tr>
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</tr>
<tr>
<td>16.</td>
<td>Other forms of activities</td>
</tr>
<tr>
<td></td>
<td>16.1. Project tasks</td>
</tr>
</tbody>
</table>
16.2. Individual tasks 1
16.3. Home learning

17. Method of assessment

17.1. Tests / oral exams 70 points
17.2. Seminars (paper / project - presentation: written and/or oral) 10 points
17.3. Activity and participation 20 points

18. Assessment Criteria (points / score)

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>up 50 points</td>
<td>5 (five) (F)</td>
</tr>
<tr>
<td>51 to 60 points</td>
<td>6 (six) (E)</td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

19. Signature requirement and passing the final exam

60% success of all pre-exam activities i.e. 42 points from two mid-term exams, seminar work and presence of lectures and exercises

20. Language of teaching / study

Macedonian

21. Method of monitoring the quality of teaching

Self-evaluation

22. Literature

<table>
<thead>
<tr>
<th>Required literature</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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</tr>
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</tr>
<tr>
<td>2.</td>
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22.2. Additional literature
<table>
<thead>
<tr>
<th>No.</th>
<th>Title of the Course</th>
<th>Quality management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Howard D. Goodfellow</td>
<td>2MF106612</td>
</tr>
<tr>
<td></td>
<td>Enco Tähti</td>
<td>University &quot;Goce Delcev&quot; - Stip</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faculty of Mechanical Engineering-Vinica</td>
</tr>
<tr>
<td>2.</td>
<td>Study Program</td>
<td>Production Engineering /</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transport, Organization and Logistics</td>
</tr>
<tr>
<td>3.</td>
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<td>University &quot;Goce Delcev&quot; - Stip</td>
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<td></td>
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</tr>
<tr>
<td>4.</td>
<td>Cycle (first, second and third cycle)</td>
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<tr>
<td>5.</td>
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<td>4&lt;sup&gt;th&lt;/sup&gt;/ 3&lt;sup&gt;rd&lt;/sup&gt;</td>
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<td>7.</td>
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<td>8.</td>
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</tr>
<tr>
<td>10.</td>
<td>Content of the course program:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Introduction to quality management (quality as a strategic goal and utility organizations for competitiveness).</td>
<td></td>
</tr>
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</table>


5. Production (item 7.1, 7.2 and 7.3 of the standard ISO 9001:2008).

6. Realization of the product (see section 7.4, 7.5 and 7.6 of the standard ISO 9001:2008).


8. Introducing the standard ISO 17025, competence of testing and calibration laboratories.


10. Introduction to ISO 14001, Environmental Management.

11. Introducing the standard OHSAS 18001 health and safety management.

12. Introduction to ISO 22000 Food Safety Management System.

<table>
<thead>
<tr>
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<tr>
<th>14. Distribution of available time</th>
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<tr>
<th>15. Forms of teaching / learning activities</th>
<th>15.1. lectures / theoretical - contact teaching, e-teaching</th>
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<table>
<thead>
<tr>
<th></th>
<th>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</th>
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<tr>
<td></td>
<td>2</td>
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<td>hours</td>
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<td></td>
<td>1 hours</td>
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<table>
<thead>
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<th>16.3. Home learning</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>hours</td>
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</tbody>
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<table>
<thead>
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<th>17.1. Tests / oral exams</th>
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<td>70 points</td>
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<th>17.2. Seminars (paper / project - presentation: written and/or oral)</th>
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<tbody>
<tr>
<td></td>
<td>10 points</td>
</tr>
<tr>
<td>17.3.</td>
<td>Activity and participation</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>18.</td>
<td>Assessment Criteria (points / score)</td>
</tr>
<tr>
<td></td>
<td>up 50 points</td>
</tr>
<tr>
<td></td>
<td>51 to 60 points</td>
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<td>61 to 70 points</td>
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<tr>
<td></td>
<td>71 to 80 points</td>
</tr>
<tr>
<td></td>
<td>81 to 90 points</td>
</tr>
<tr>
<td></td>
<td>91 to 100 points</td>
</tr>
<tr>
<td>19.</td>
<td>Signature requirement and passing the final exam</td>
</tr>
<tr>
<td></td>
<td>60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions</td>
</tr>
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<td>20.</td>
<td>Language of teaching / study</td>
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<tr>
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<td>Macedonian</td>
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<tr>
<td>21.</td>
<td>Method of monitoring the quality of teaching</td>
</tr>
<tr>
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<table>
<thead>
<tr>
<th>22.</th>
<th>Literature</th>
</tr>
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<tbody>
<tr>
<td>22.1.</td>
<td>Required literature</td>
</tr>
<tr>
<td>No.</td>
<td>Author</td>
</tr>
<tr>
<td></td>
<td>Standardization institute of RM</td>
</tr>
<tr>
<td>3.</td>
<td>Prof. d-r. Sc. Hrvoje Skoko</td>
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<tr>
<td>22.2.</td>
<td>Additional literature</td>
</tr>
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<td>No.</td>
<td>Author</td>
</tr>
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<td>Annex No.3</td>
<td>Program of the Course - first cycle studies</td>
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<tr>
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<td>-------------------------------------------</td>
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<tr>
<td>1. Title of the Course</td>
<td>Occupational Safety and Health</td>
</tr>
<tr>
<td>2. Code</td>
<td>2FP123212</td>
</tr>
<tr>
<td>3. Study Program</td>
<td>Production engineering</td>
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<td>4. Organizer of the study program (unit or institute, Faculty, department)</td>
<td>University &quot;Goce Delcev&quot; - Stip Faculty of Mechanical Engineering-Vinica</td>
</tr>
<tr>
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<td>First cycle</td>
</tr>
<tr>
<td>6. Academic year / semester</td>
<td>IV VIII semester</td>
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<td>7. Number of credits</td>
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<tr>
<td>8. Professor (s)</td>
<td>Assistant Professor Dejan Mirakovski, PhD</td>
</tr>
<tr>
<td>9. Requirements for enrollment the Course</td>
<td>Enrolled semester</td>
</tr>
</tbody>
</table>

10. Purposes of the curriculum (competencies):
    Introducing to the fundamental provisions of the Occupational Safety and Health Law, hazards and risks on the workplace.

11. Content of the course program:
    1. Introduction
    2. Legislation in the field of Occupational Safety and Health
    3. Role of International Labour Organization
    4. Occupational Risk Assessment
    5. Ergonomics
    6. Injuries at work, etiological factors for injuries and occupational diseases
    7. Gasses in working environment
    8. Dust and measurement methods of dust in the working environment
    9. Fires, exogenous, endogenous fires, fire prevention and fire-fighting procedures
    10. Explosions, explosive mixtures of gas and air, technical protection measures
11. Microclimate conditions, noise and vibrations in working environment

12. Personal Protective Equipment, Rescue services and plans for defense and rescue

<table>
<thead>
<tr>
<th>12. Learning methods:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Lectures,</td>
</tr>
<tr>
<td>- theoretical and practical exercises,</td>
</tr>
<tr>
<td>- e-teaching,</td>
</tr>
<tr>
<td>- seminar work</td>
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<tr>
<td>- consultation</td>
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<th>13. Total available time</th>
<th>120 hours</th>
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<th>14. Distribution of available time</th>
<th>2+1+1</th>
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<table>
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<th>15. Forms of teaching / learning activities</th>
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<tr>
<td>15.1. lectures / theoretical - contact teaching, e-teaching</td>
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<tr>
<td>15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work</td>
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<table>
<thead>
<tr>
<th>16. Other forms of activities</th>
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<tbody>
<tr>
<td>16.1. Project tasks</td>
</tr>
<tr>
<td>16.2. Individual tasks</td>
</tr>
<tr>
<td>16.3. Home learning</td>
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<table>
<thead>
<tr>
<th>17. Method of assessment</th>
</tr>
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<tbody>
<tr>
<td>17.1. Tests / oral exams</td>
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<tr>
<td>17.2. Seminars (paper / project - presentation: written and/or oral)</td>
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<tr>
<td>17.3. Activity and participation</td>
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<tr>
<th>18. Assessment Criteria (points / score)</th>
<th>up 50 points</th>
<th>5(five) (F)</th>
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<tbody>
<tr>
<td>51 to 60 points</td>
<td>6(six) (E)</td>
<td></td>
</tr>
<tr>
<td>61 to 70 points</td>
<td>7 (seven) (D)</td>
<td></td>
</tr>
<tr>
<td>71 to 80 points</td>
<td>8 (eight) (C)</td>
<td></td>
</tr>
<tr>
<td>81 to 90 points</td>
<td>9 (nine) (B)</td>
<td></td>
</tr>
<tr>
<td>91 to 100 points</td>
<td>10 (ten) (A)</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Signature requirement and passing the final exam</td>
<td>60% success of all pre-exam activities i.e. 42 points from two mid-term exams, seminar work and presence on lectures and exercises</td>
</tr>
<tr>
<td>20.</td>
<td>Language of teaching / study</td>
<td>Macedonian</td>
</tr>
<tr>
<td>21.</td>
<td>Method of monitoring the quality of teaching</td>
<td>Self-evaluation</td>
</tr>
</tbody>
</table>

| 22. | Literature |
| | **Required literature** |
| | **No.** | **Author** | **Title** | **Publisher** | **Year** |
| | 1. | Dejan Mirakovski, Marija Hadzi-Nikolova | Occupational Safety and Health | University Goce Delcev | 2012 |
| | 2. | | | | |
| | 3. | | | | |
| | **Additional literature** |
| | **No.** | **Author** | **Title** | **Publisher** | **Year** |
| | 2. | | | | |
| | 3. | | | | |

Annex No.3 | Program of the Course - first cycle studies

<p>| 1. | <strong>Title of the Course</strong> | Computer Aided Manufacturing (CAM) |
| 2. | <strong>Code</strong> | 2MF103112 |
| 3. | <strong>Study Program</strong> | Production Engineering |
| 4. | <strong>Organizer of the study program (unit or institute, Faculty, department)</strong> | University “Goce Delcev” - Stip. Faculty of Mechanical Engineering - Vinica |</p>
<table>
<thead>
<tr>
<th></th>
<th><strong>Cycle (first, second and third cycle)</strong></th>
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<tbody>
<tr>
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<td><strong>Academic year / semester</strong></td>
<td>fourth/ eighth</td>
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<tr>
<td>7.</td>
<td><strong>Number of credits</strong></td>
<td>4</td>
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<tr>
<td>8.</td>
<td><strong>Professor (s)</strong></td>
<td>Assi. Prof. Simeon Simeonov, Ph.D</td>
</tr>
</tbody>
</table>
| 9. | **Requirements for enrollment the Course** | Attended course of:  
- CAD technology  
- Programming Numerically controlled machines (CNC) |
| 10. | **Purposes of the curriculum (competencies):** | Students are introduced to making programs for management of manufacturing process, specifically with CNC machines |
| 11. | **Content of the course program:**       | Introduction; CAM basic knowledge; Geometric elements; Milling components; Modelling; Final operations; Turning; Processes of wire erosion. |
| 12. | **Learning methods:**                    | Lectures, Laboratory exercises, e-learning, individual and team projects, consultations. |
| 13. | **Total available time**                 | 120 hours   |
| 14. | **Distribution of available time**       | 2 +1 +1/ per week |
| 15. | **Forms of teaching / learning activities** | 15.1. lectures / theoretical - contact teaching, e-teaching  
15.2. theoretical and practical exercises, e-exams, preparation of independent seminar work |
| 16. | **Other forms of activities**            | 16.1. Project tasks  
16.2. Individual tasks  
16.3. Home learning |
| 17. | **Method of assessment**                 | 17.1. Tests / oral exams  
17.2. Seminars (paper / project - presentation: written and/or oral)  
17.3. Activity and participation |
|    |                                          | 70          |
|    |                                          | 10          |
|    |                                          | 20          |
18. **Assessment Criteria (points / score)**

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>to 50 points</td>
<td>5(five) (F)</td>
</tr>
<tr>
<td>from 51 to 60 points</td>
<td>6(six) (E)</td>
</tr>
<tr>
<td>from 61 to 70 points</td>
<td>7 (seven) (D)</td>
</tr>
<tr>
<td>from 71 to 80 points</td>
<td>8 (eight) (C)</td>
</tr>
<tr>
<td>from 81 to 90 points</td>
<td>9 (nine) (B)</td>
</tr>
<tr>
<td>from 91 to 100 points</td>
<td>10 (ten) (A)</td>
</tr>
</tbody>
</table>

19. **Signature requirement and passing the final exam**

60% of pre-exam activities or minimum 42 points from 2 midterm exams, project activities and attending of lectures and discussions.

20. **Language of teaching / study**

Macedonian

21. **Method of monitoring the quality of teaching**

Self-evaluation

22. **Literature**

<table>
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<tr>
<th>Required literature</th>
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</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
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<tr>
<td>1.</td>
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<td>2.</td>
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<tr>
<td>3.</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>No.</td>
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<td>1.</td>
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<td>2.</td>
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<td>3.</td>
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<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
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</table>
| 4. | **Organizer of the study program**  
(unit or institute, Faculty, department) | University “Goce Delcev”- Stip  
Faculty of Mechanical Engineering - Vinica |
| 5. | **Cycle (first, second and third cycle)** | First cycle |
| 6. | **Academic year / semester** | 4 year / semester  
7 |
| 7. | **Number of ECTS credits** | 4 |
| 8. | **Professor (s)** | Ass. Prof. Bratica Temelkoska, PhD |
| 9. | **Requirements for enrollment the Course** | No |
| 10. | **Purposes of the curriculum (competencies):** | Introduction to types of energy, energy efficiency, energy efficiency modelling and management of energy efficiency. |
| 11. | **Content of the course program:** | |
|  | 1. Energy: Forms, features and sizes; energy conservation; energy sources; Energy; Energy Saving; In general for Energy Efficiency; Energy Efficiency in Buildings |
|  | 2. Energy efficiency in industry; Energy efficiency in thermal power plants; Energy efficiency of non-conventional energy sources and facilities; Energy efficiency in transport; Modelling and analysis of energy efficient systems; Energy Management. |
| 12. | **Learning methods:** | Lectures with slide presentations, exercises, independent elaboration and defense of the project task |
| 13. | **Total available time** | 120 hours |
| 14. | **Distribution of available time** | 2+1+1 |
| 15. | **Forms of teaching / learning activities** | |
|  | 15.1. | lectures / theoretical - contact teaching, e-teaching |
|  | 15.2. | theoretical and practical exercises, |
| 16. | Other forms of activities | 16.1. | Project tasks |
|     |                         | 16.2. | Individual tasks | 1 |
|     |                         | 16.3. | Home learning |

| 17. | Method of assessment |
|     | 17.1. Tests / oral exams | 70 points |
|     | 17.2. Seminars (paper / project - presentation: written and/or oral) | 10 points |
|     | 17.3. Activity and participation | 20 points |

| 18. | Assessment Criteria (points / score) | up 50 points | 5 (five) (F) |
|     |                               | 51 to 60 points | 6 (six) (E) |
|     |                               | 61 to 70 points | 7 (seven) (D) |
|     |                               | 71 to 80 points | 8 (eight) (C) |
|     |                               | 81 to 90 points | 9 (nine) (B) |
|     |                               | 91 to 100 points | 10 (ten) (A) |

| 19. | Signature requirement and passing the final exam |
|     | 60% success from all activities before exam i.e. 42 points from two mid-term exams, seminar paper, attendance of lectures and exercises |

| 20. | Language of teaching / study |
|     | Macedonian |

| 21. | Method of monitoring the quality of teaching |
|     | Self-evaluation |

| 22. | Literature |
|     | Required literature |
|     | Order No. | Author | Title            | Publisher | Year |
|     | 1.        | D.Tashevski | energy Efficiency | Draft    | 2010 |
|     | 2.        |            |                  |          |     |
|     | 3.        |            |                  |          |     |

| 22.2 | Additional literature |

<table>
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