

# AIR CONDITIONING AND REFRIGERATION SOFTWARE

|           |                                                                                   |                                                                                                   |                                                                                    |
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| <b>1</b>  | Course Title:                                                                     | AIR CONDITIONING AND REFRIGERATION SOFTWARE                                                       |                                                                                    |
| <b>2</b>  | Course Code:                                                                      | İSOS226                                                                                           |                                                                                    |
| <b>3</b>  | Type of Course:                                                                   | Optional                                                                                          |                                                                                    |
| <b>4</b>  | Level of Course:                                                                  | Short Cycle                                                                                       |                                                                                    |
| <b>5</b>  | Year of Study:                                                                    | 2                                                                                                 |                                                                                    |
| <b>6</b>  | Semester:                                                                         | 4                                                                                                 |                                                                                    |
| <b>7</b>  | ECTS Credits Allocated:                                                           | 3.00                                                                                              |                                                                                    |
| <b>8</b>  | Theoretical (hour/week):                                                          | 2.00                                                                                              |                                                                                    |
| <b>9</b>  | Practice (hour/week):                                                             | 0.00                                                                                              |                                                                                    |
| <b>10</b> | Laboratory (hour/week):                                                           | 0                                                                                                 |                                                                                    |
| <b>11</b> | Prerequisites:                                                                    | No                                                                                                |                                                                                    |
| <b>12</b> | Language:                                                                         | Turkish                                                                                           |                                                                                    |
| <b>13</b> | Mode of Delivery:                                                                 | Face to face                                                                                      |                                                                                    |
| <b>14</b> | Course Coordinator:                                                               | Prof. Dr. SALİH COŞKUN                                                                            |                                                                                    |
| <b>15</b> | Course Lecturers:                                                                 | Meslek Yüksekokulları Yönetim Kurullarının görevlendirdiği öğretim elemanları.                    |                                                                                    |
| <b>16</b> | Contact information of the Course Coordinator:                                    | coskuns@uludag.edu.tr                                                                             |                                                                                    |
| <b>17</b> | Website:                                                                          |                                                                                                   |                                                                                    |
| <b>18</b> | Objective of the Course:                                                          | to learn softwares about air conditioning and refrierations                                       |                                                                                    |
| <b>19</b> | Contribution of the Course to Professional Development:                           | to make faster of system design and calculation steps in air conditioning and refrigeration field |                                                                                    |
| <b>20</b> | Learning Outcomes:                                                                |                                                                                                   |                                                                                    |
|           |                                                                                   | <b>1</b>                                                                                          | To be able to do capacity calulations for different refrigerants by using software |
|           |                                                                                   | <b>2</b>                                                                                          | To be able to calculate heat gain by using software                                |
|           |                                                                                   | <b>3</b>                                                                                          | To be able to select cooling equipments by using software                          |
|           |                                                                                   | <b>4</b>                                                                                          | To be able to perform psychrometric calculations by using software                 |
|           |                                                                                   | <b>5</b>                                                                                          | To be able to select air handling unit by using software                           |
|           |                                                                                   | <b>6</b>                                                                                          | To be able to select pump by using software                                        |
|           |                                                                                   | <b>7</b>                                                                                          | To be able to select chiller by using software                                     |
|           |                                                                                   | <b>8</b>                                                                                          | To be able to cooling tower by using software                                      |
|           |                                                                                   | <b>9</b>                                                                                          | To be able to select fan-coil by using software                                    |
|           |                                                                                   | <b>10</b>                                                                                         |                                                                                    |
| <b>21</b> | Course Content:                                                                   |                                                                                                   |                                                                                    |
|           |                                                                                   | <b>Course Content:</b>                                                                            |                                                                                    |
| Week      | Theoretical                                                                       | Practice                                                                                          |                                                                                    |
| <b>1</b>  | Presentation of software used in the field of air conditioning and refrigeration  |                                                                                                   |                                                                                    |
| <b>2</b>  | Cooling capacity calculation and performance calculation for various refrigerants |                                                                                                   |                                                                                    |
| <b>3</b>  | Heat gain calculation                                                             |                                                                                                   |                                                                                    |
| <b>4</b>  | Compressor selection                                                              |                                                                                                   |                                                                                    |
| <b>5</b>  | Air and water cooled evaporator selection                                         |                                                                                                   |                                                                                    |

|           |                                        |  |
|-----------|----------------------------------------|--|
| <b>6</b>  | Air cooled condenser selection         |  |
| <b>7</b>  | Water cooled condenser selection       |  |
| <b>8</b>  | Evaporative condenser selection        |  |
| <b>9</b>  | Cooling tower selection                |  |
| <b>10</b> | Thermostatic expansion valve selection |  |
| <b>11</b> | Pump selection                         |  |
| <b>12</b> | Air Handling Unit selection            |  |
| <b>13</b> | Chiller selection                      |  |
| <b>14</b> | Fan-coil selection                     |  |
|           |                                        |  |

| Activites                  | Number | Duration (hour) | Total Work Load (hour) |
|----------------------------|--------|-----------------|------------------------|
| Theoretical                | 14     | 2.00            | 28.00                  |
| Practicals/Labs            | 0      | 0.00            | 0.00                   |
| Self study and preperation | 14     | 4.00            | 56.00                  |
| Homeworks                  | 0      | 0.00            | 0.00                   |
| Projects                   | 0      | 0.00            | 0.00                   |
| Field Studies              | 0      | 0.00            | 0.00                   |
| Midterm exams              | 1      | 1.00            | 1.00                   |
| Others                     | 0      | 0.00            | 0.00                   |
| Final Exams                | 1      | 1.00            | 1.00                   |
| Total Work Load            |        |                 | 87.00                  |
| Total work load/ 30 hr     |        |                 | 2.87                   |
| ECTS Credit of the Course  |        |                 | 3.00                   |

|    |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| 22 | Textbooks, References and/or Other Materials: | <p>ABB_EU2000_KLİMA (klima santral seçimi) 23,4 mb<br/>www.abb.com</p> <p>2 Aircond (klima seçimi) 26,9 mb Century co.</p> <p>3 Caps V2 (Tuthill pompa seçimi) 1,69 mb<br/>www.tuthillpump.com</p> <p>4 Carwin V1.55 (carlyle kompresör seçimi) 3,46 mb Carlyle compressor co.</p> <p>5 Cbgcat (elektrolux kompresör seçimi) 4,98 mb<br/>www.cubigel.com</p> <p>6 Comprex (dorin kompresör seçimi) 4,95 mb<br/>www.dorin.com</p> <p>7 Comsel (grasso kompresör seçimi) 1,61 mb<br/>www.grasso.nl</p> <p>8 Condense (BAC kondenser seçimi) 2,03 mb<br/>www.bac.com</p> <p>9 Cooling Tower (BAC soğutma kulesi seçimi) 11,1 mb<br/>www.bac.com</p> <p>10 EC_70 (BAC evaporatif kondenser seçimi) 10,5 mb<br/>www.bac.com</p> <p>11 Coolcat 3.1 (Danfoss aksesuar seçimi) 2,2 mb<br/>www.danfoss.com</p> <p>12 Disk_UH (Tecumseh kompresör seçimi) 2,22 mb<br/>www.tecumseh-europe.com</p> <p>13 Frawin 1.1 (Frascold kompresör seçimi) 2,24 mb<br/>www.frascold.com</p> <p>14 Hit32 (Halton havalandırma ekipman seçimi) 80,9 mb<br/>www.halton.com</p> <p>15 İmco (imco havalandırma ekipman kataloğu) 275 mb<br/>www.imco.com.tr</p> <p>16 Kes klima (ürün tanıtım mpeg dosyası) 42,3 mb<br/>www.kesklima.com</p> <p>17 Massecim (Mas pompa seçimi) 15,8 mb Mas pompa tic. A.Ş.</p> <p>18 Ostberg (fan tanıtımı) 3,32 mb www.imco.com.tr</p> <p>19 Pamsan (ürün tanıtımı) 25,6 mb www.pamsan.com.tr</p> <p>20 Palladio 3.31 (alfa-laval evap-kondenser seçimi) 9,21 mb<br/>www.alfalaval.com</p> <p>21 İnPhorn 1.1 (parker soğutma aksesuar seçimi) 13,6 mb<br/>www.parker.com</p> <p>22 RS+ 2.0 (Danfoss-maneurop kompresör seçimi) 30,8 mb<br/>www.danfoss-maneurop.com</p> <p>23 Select_Full_2 (Copeland kompresör seçimi) 1,69 mb<br/>www.copeland-corp.com</p> <p>24 Valvedim (Sauter vana ve sürücü seçimi) 2,33 mb<br/>www.ch.sauter-bc.com</p> <p>25 Vap 3.2 (Bock kompresör seçimi) 1,38 mb<br/>www.bock.de</p> <p>26 Ventil 2.02 (Nicotra fan seçimi) 8,5 mb<br/>www.nicotra.com</p> <p>27 Whitzer (Bitzer kompresör-sulu kondenser seçimi) 4,75 mb<br/>www.bitzer.de</p> <p>28 Wilo22En (Wilo pompa seçimi) 49,3 mb www.wilo.com</p> <p>29 WinChillCalc 1,04 mb www.grasso.de</p> <p>30 Winnergy V4.3 (ısı değiştirici seçimi) 2,29 mb Innergy Tech Inc.</p> <p>31 York (ürün tanıtım kataloğu) 19 mb www.york.com</p> |
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| 23                                                               | Assesment  |        |
| TERM LEARNING ACTIVITIES                                         | NUMBE<br>R | WEIGHT |
| Midterm Exam                                                     | 1          | 40.00  |
| Quiz                                                             | 0          | 0.00   |
| Home work-project                                                | 0          | 0.00   |
| Final Exam                                                       | 1          | 60.00  |
| Total                                                            | 2          | 100.00 |
| Contribution of Term (Year) Learning Activities to Success Grade |            | 40.00  |

|                                                          |                                                                                                                                                    |
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| Contribution of Final Exam to Success Grade              | 60.00                                                                                                                                              |
| Total                                                    | 100.00                                                                                                                                             |
| Measurement and Evaluation Techniques Used in the Course | Measurement and evaluation is carried out according to the principles of Bursa uludag University Associate and Undergraduate Education Regulation. |
| <b>24</b>                                                | <b>ECTS / WORK LOAD TABLE</b>                                                                                                                      |

| <b>25</b>                                                    | <b>CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS</b> |     |     |              |     |     |                 |     |     |               |      |      |                    |      |      |      |
|--------------------------------------------------------------|----------------------------------------------------------------------|-----|-----|--------------|-----|-----|-----------------|-----|-----|---------------|------|------|--------------------|------|------|------|
|                                                              | PQ1                                                                  | PQ2 | PQ3 | PQ4          | PQ5 | PQ6 | PQ7             | PQ8 | PQ9 | PQ10          | PQ11 | PQ12 | PQ13               | PQ14 | PQ15 | PQ16 |
| ÖK1                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK2                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK3                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK4                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK5                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK6                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK7                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK8                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| ÖK9                                                          | 5                                                                    | 0   | 0   | 0            | 5   | 0   | 0               | 0   | 0   | 0             | 0    | 0    | 0                  | 0    | 0    | 0    |
| <b>LO: Learning Objectives    PQ: Program Qualifications</b> |                                                                      |     |     |              |     |     |                 |     |     |               |      |      |                    |      |      |      |
| <b>Contribution Level:</b>                                   | <b>1 very low</b>                                                    |     |     | <b>2 low</b> |     |     | <b>3 Medium</b> |     |     | <b>4 High</b> |      |      | <b>5 Very High</b> |      |      |      |