**ESOGU MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| REFRIGERATION | 151818466 |

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| **Semester** | **Number of Course Hours per Week** | **ECTS** |
| **Theory** | **Practice** |
| 8 | 3 | 0 | 5 |

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| **Course Category (Credit)** |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  | X |  |  |

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| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

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| **Prerequisite(s) if any** |  |
| **Objectives of the Course** | The course aims to provide students with the ability to recognize, interpret and design cooling systems, to recognize the refrigerants used in cooling systems, basic and auxiliary elements of the cooling system, and to make cold room cooling load calculations. |
| **Short Course Content** | Cooling systems, refrigerants, their properties and usage areas, cycle calculations in vapor compression refrigeration cycle, use of pressure enthalpy diagram, cold room cooling load calculations. |

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| **Learning Outcomes of the Course** | **Contributed PO(s)**  | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Knows cooling systems and their features. | 1,6,11 | 1,8 | K |
| **2** | Knows the refrigerants used in cooling systems and their properties | 1,6,9,11 | 1,8 | K |
| **3** | Recognizes the basic and auxiliary elements used in cooling systems and knows the installation conditions. | 1,6 | 1,8 | K |
| **4** | Knows how to read and use a pressure-enthalpy diagram | 1,2,3 | 1,8 | D, E, K |
| **5** | Calculate the vapor compression refrigeration cycles. | 1,2,3 | 1,8,10,15 | D, E, K |
| **6** | Calculates the cooling load for the cold storage and designs it. | 1,2,3,6,7 | 1,8,10,15 | E, G, J, K |
| **7** |  |  |  |  |
| **8** |  |  |  |  |

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| **Main Textbook** | - Yamankaradeniz, R., Horuz, İ., Coşkun, S., Kaynaklı, Ö., Yamankaradeniz, N., (2013) “Soğutma Tekniği ve Isı Pompası Uygulamaları”, Dora yayıncılık. |
| **Supporting References** | - Coolpack yazılımı,- Coolselector yazılımı,- Cool Tools yazılımı- Friterm Ürün Seçim yazılımı |
| **Necessary Course Material** | Computer, projector. |

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| **Course Schedule** |
| **1** | Basic concepts for cooling systems |
| **2** | Cooling applications, basic and auxiliary elements |
| **3** | Vapor compression refrigeration cycle |
| **4** | Comparison of vapor compression refrigeration cycle and Carnot cycle |
| **5** | Actual vapor compression refrigeration cycle |
| **6** | Superheat and subcooling |
| **7** | Use of pressure-enthalpy diagram |
| **8** | Mid-Term Exam |
| **9** | Refrigerants |
| **10** | Condenser, evaporator, compressor and expansion elements |
| **11** | Two stage cooling systems |
| **12** | Project design principles in cold room |
| **13** | Cooling load calculation in cold room |
| **14** | Cooling load calculation in cold room |
| **15** | Project design of cold room |
| **16,17** | Final Exam |

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| **Calculation of Course Workload** |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 1 | 20 | 20 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam  |  |  |  |
| Studying for Oral Exam  |  |  |  |
| Report (Preparation and presentation time included) | 2 | 20 | 40 |
| Project (Preparation and presentation time included) | 1 | 22 | 22 |
| Presentation (Preparation time included) |  |  |  |
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| Mid-Term Exam |  |  |  |
| Studying for Mid-Term Exam |  |  |  |
| Final Exam |  |  |  |
| Studying for Final Exam |  |  |  |
|  | **Total workload** | **138** |
|  | **Total workload / 30** | **4.6** |
|  | **Course ECTS Credit** | **5** |

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| **Evaluation** |
| **Activity Type** | **%** |
| Mid-term |  |
| Quiz |  |
| Homework | 50 |
| Bir öğe seçin. |  |
| Project Observation | 50 |
| **Final Exam** |  |
| **Total** | 100 |

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| **RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO)** (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low) |
| **NO** | **PROGRAM OUTCOME** | **Contribution** |
| **1** | Sufficient knowledge of engineering subjects related with mathematics, science and mechanical engineering; an ability to apply theoretical and practical knowledge on solving and modeling of mechanical engineering problems. | 4 |
| **2** | Ability to determine, define, formulate and solve complex mechanical engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | 4 |
| **3** | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | 4 |
| **4** | Ability to develop, select and use modern methods and tools required for mechanical engineering applications; ability to effective use of information technologies.  | 2 |
| **5** | In order to investigate mechanical engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | 1 |
| **6** | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | 3 |
| **7** | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | 2 |
| **8** | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | 2 |
| **9** | Understanding of professional and ethical issues and taking responsibility.  | 3 |
| **10** | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | 2 |
| **11** | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | 4 |
| **12** |  |  |

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| **LECTUTER(S)** |
| **Prepared by** | Associate Professor Özge ALTUN |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:**06.06.2024