** ESOGÜ SİVRİHİSAR VOCATİONAL SCHOOL  
 DEPARTMENT OF ELECTRİCİTY AND ENERGY ALTERNATİVE ENERGY SOURCES TECHNOLOGY PROGRAM**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| TURKISH LANGUAGE I | **221011006** |

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| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 2 |

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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 | Associate degree | Compulsory |

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| **Prerequisite(s) if any** | NO |
| **Objectives of the Course** | To show the richness of Turkish by informing students about the development and current situation of Turkish, to gain a national language awareness, to ensure that they can speak and write Turkish correctly. To compare Turkish language with major languages in the world. To compare the language policies of major languages with the language policy of Turkish language. To give speech training. |
| **Short Course Content** | Definition and properties of language; languages of the world and the place of Turkish among the world languages; historical development of Turkish language and the development of Western Turkish; Atatürk's studies and views on Turkish language; phonetics; spelling rules and punctuation; language policies. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student explains the language families of the world and the place of Turkish among the world languages. | 1 | 1 | A |
| **2** | Defines the rules of Turkish. | 1 | 1, 5 | A |
| **3** | Recognizes sound events. | 1 | 1, 5, 11 | A |
| **4** | Applies spelling rules. | 3, 10 | 5, 6 | A |
| **5** | Compose written and oral compositions. | 3, 10 | 6 | A |
| **6** | Uses Turkish correctly. | 3, 9, 10, 11 | 6, 11 | A |

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| **Main Textbook** | *Türk Dili I-II*, ed. Ferruh Ağca, Eskişehir Osmangazi Üniversitesi Yayınları, 2022**.** |
| **Supporting References** | *Üniversiteler İçin Türk Dili*, Bayrak Yayınları, İstanbul, 1997. |
| **Necessary Course Material** |  |

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| **Course Schedule** | |
| **1** | Definition of Language |
| **2** | Language-Nationality-Culture Relationship |
| **3** | World Languages and Turkish Language |
| **4** | Age of Turkish Language |
| **5** | Historical Development of Turkish Language |
| **6** | Alphabets Used in Turkish Writing |
| **7** | Writing Revolution |
| **8** | Mid-Term Exam |
| **9** | Phonetics of Turkish Language |
| **10** | Phonetics of Turkish Language |
| **11** | Morphology of Turkish Language |
| **12** | Morphology of Turkish Language |
| **13** | Word Groups |
| **14** | Word Groups |
| **15** | Word Groups |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 4 | 4 | 16 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 4 | 4 |
|  | **Total workload** | | **56** |
|  | **Total workload / 30** | | **1,86** |
|  | **Course ECTS Credit** | | **2** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 2 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 4 |

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**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| THE HISTORY OF THE PRINCIPLES AND THE REVOLUTIONS OF ATATURK I | **221011001** |

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| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 2 |

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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 | Associate degree | Compulsory |

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| **Prerequisite(s) if any** | None |
| **Objectives of the Course** | Students can understand the Liberation War under the leadership of Atatürk and the foundation of the young Turkish Republic. In addition to that the students will learn the processes of the liberation war and the conditions before the foundation of the Republic. |
| **Short Course Content** | The description of the revolution; the history of the Ottoman Empire up to the beginning of the Great War; Great War; The Treaty of Mudros; The Life of Mustafa Kemal Pasha; Civil Organizations for the liberation; Mustafa Kemal’s arrival to Samsun; Congresses; National Oath and the Opening of Turkish Grand National Assembly; Liberation War till the Battle of Sakarya; Büyük Taarruz. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | STUDENTS,  understand the main concepts of the course like reform, revolution | 1, 10, 11 | Expression | Class Attendance |
| **2** | learn the short history of the Ottoman Empire up to the Great War | 1, 10, 11 | Expression | Class Attendance |
| **3** | understand the join of the Ottoman Empire to the Great War and the fronts in which the Ottoman Empire fought | 1, 10, 11 | Expression | Class Attendance |
| **4** | learn the Treaty of Mudros and the invasion of the Ottoman lands | 1, 10, 11 | Expression | Class Attendance |
| **5** | understand the life of Mustafa Kemal Pasha (Atatürk) | 1, 10, 11 | Expression | Class Attendance |
| **6** | learn Mustafa Kemal’s arrival to Samsun and the beginning of the Liberation War | 1, 10, 11 | Expression | Class Attendance |
| **7** | understand the opening of Turkish Grand National Assembly and the foundation of national army | 1, 10, 11 | Expression | Class Attendance |
| **8** | learn the victories of İnonü, Sakarya and Büyük Taarruz | 1, 10, 11 | Expression | Class Attendance |

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| **Main Textbook** | Turan Şerafettin, *Türk Devrim Tarihi, C.I-II*, İstanbul, 1991–1995 |
| **Supporting References** | Ateş, Toktamış, *Türk Devrim Tarihi*, İstanbul: Der Yayınları, 2001.  Aybars, Ergün, *Türkiye Cumhuriyeti Tarihi*, İzmir: Ercan Kitabevi, 2000.  Eroğlu, Hamza, *Türk İnkılap Tarihi*, Ankara: Savaş Yayınları, 1990.  Kongar, Emre, *Devrim Tarihi ve Toplumbilim Açısından Atatürk*, İstanbul: Remzi Kitabevi, 1999.  Selek, Sebahattin, *Anadolu İhtilali,* İstanbul: Kastaç Yayınları, 1987.  Timur, Taner, *Türk Devrimi ve Sonrası*, Ankara: İmge Kitabevi, 1997. |
| **Necessary Course Material** |  |

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| **Course Schedule** | |
| **1** | The teaching of the concepts of Revolution, Evolution, Uprising etc. |
| **2** | The attempts for the modernisation of the Ottoman Empire and the political thoughts |
| **3** | The Wars of Trablusgarp and the Balkans |
| **4** | The Beginning of the Great War and the join of the Ottoman Empire |
| **5** | The fronts in which the Ottoman Empire fought |
| **6** | The end of the war and the partition of the Ottoman |
| **7** | The Treaty of Mudros and the invasion of the Ottoman lands |
| **8** | Mid-Term Exam |
| **9** | The trip of Mustafa Kemal to Samsun and the beginning National Struggle |
| **10** | National Oath and the opening of Turkish Grand National Assembly |
| **11** | National Assembly and the direction of liberation war |
| **12** | National Forces and the foundation of the national army |
| **13** | First and Second Victories of İnönü; The battles of Kütahya-Eskişehir |
| **14** | The Battle of Sakarya |
| **15** | Great Attack of 30th August |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 8 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 8 | 8 |
|  | **Total workload** | | **60** |
|  | **Total workload / 30** | | **2** |
|  | **Course ECTS Credit** | | **2** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 3 |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| ENGLİSH I | **221011007** |

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| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 3 | 0 | 3 | 2 |

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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** |
| English | Associate degree | Compulsory |

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| **Prerequisite(s) if any** | NO |
| **Objectives of the Course** | Students at this level can understand sentences and frequently-used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment).  Students can understand clear, slow, standard speech related to areas of most immediate personal relevance (e.g. very basic personal and family information, shopping, local geography and employment) and can catch the main point in short, clear, simple messages and announcements.  Students are able to read and understand short, simple texts containing high frequency vocabulary and shared international expressions.  Students can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar topics and activities.  They can write short, simple notes and messages relating to matters in areas of immediate need, linking a series of simple phrases and sentences with simple connectors like ‘and’ , ‘but’ and ‘because’. |
| **Short Course Content** | The aim of the course is to teach students basic grammar rules in elementary level, give them speaking, writing, reading and listening knowledge of English. It consists of content and activities aimed at having students acquire Beginner Level English language skills according to evaluation and reference system of The Common European Framework. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student becomes familiar with basic grammar rules in English | 1 | 1, 5, 11 | A |
| **2** | Analyzes English dialogues. | 1 | 1, 4, 5, 11 | A |
| **3** | Understands and explains an English text at the level. | 4, 10 | 1, 4, 5, 11 | A |
| **4** | Communicates in written and spoken English. | 4, 10 | 1, 4, 5, 11 | A |

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| **Main Textbook** | Warwick L., Williams D. (2020). *Roadmap A2 Students’ Book & Workbook*. Pearson Education Limited. |
| **Supporting References** | Murphy, R., (2004). *English Grammar in Use*, Cambridge University Press, |
| **Necessary Course Material** | Computer, Webcam, Speakers; or Smart phone |

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| **Course Schedule** | | | | |
| **1** | 1A: verb be – positive and negative - countries and nationalities  contractions with be introduce yourself - write an online message - using capital letters and full stops | | | |
| **2** | 1B: questions with *be* question words intonation in questions ask and answer questions - understand a simple conversation understanding question words | | | |
| **3** | 1C: *this, that, these* and those everyday objects - *this*, *these* talk about things for sale - understand adverts identifying specific information  1D: tell the time | | | |
| **4** | 2A: possessive adjectives and possessive ’*s* family members possessive *’s* describe your family - understand a conversation about family - and, too and but  2B: *whose* and possessive pronouns - everyday objects 2 - possessive pronouns say who things belong to - understand online posts - understanding the important words | | | |
| **5** | *2C: have got -* adjectives describing objects *have*/*has* describe objects English in action buy things in a shop buy things in a shop - write a review of a product using and, but and so  2D: buy things in a shop | | | |
| **6** | 3A present simple with *I, you, we* and *they*; adverbs of frequency and time expressions - free-time activities  - talk about free-time Activities - write an online profile - using commas and apostrophes | | | |
| **7** | 3B present simple with *he, she* and *it -* everyday activities - present simple with *he, she* and *it-* describe daily routines - understand a factual text - using headings to find information | | | |
| **8** | Mid-Term Exam | | | |
| **9** | 3C present simple questions free-time activities 2 *do*/*does* ask about free-time activities – understand short talks - understanding key words  3D buy tickets | | | |
| **10** | 4A there is/are - places in a city - linking - talk about your city - write a description - using word order correctly  4B articles - things in a home - the - describe your home - understand social media posts - guessing new words | | | |
| **11** | 4C need + noun, need + infinitive with to - equipment - weak forms - discuss what to take on a trip - understand a short radio programme - understanding weak forms  4D ask for information | | | |
| **12** | 5A position of adjectives - appearance - tonic stress on adjectives - describe people’s appearance - write a description of a person - using paragraphs | | | |
| **13** | 5B was/were - adjectives to describe experiences - weak forms of was/were - describe an experience - understand a story - linking between words | | | |
| **14** | 5C can/can’t for ability - skills - can/can’t - describe your skills - understand information in a brochure - understanding it, they and them  5D make and respond to requests | | | |
| **15** |  | | | |
| **16,17** | Final Exam | | | |
| **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 | 2 | 2 |
| Quiz Exam | |  |  |  |
| Studying for Quiz Exam | |  |  |  |
| Oral exam | |  |  |  |
| Studying for Oral Exam | |  |  |  |
| Report (Preparation and presentation time included) | |  |  |  |
| Project (Preparation and presentation time included) | |  |  |  |
| Presentation (Preparation time included) | |  |  |  |
| Mid-Term Exam | | 1 | 2 | 2 |
| Studying for Mid-Term Exam | | 1 | 4 | 4 |
| Final Exam | | 1 | 2 | 2 |
| Studying for Final Exam | | 1 | 6 | 6 |
|  | | **Total workload** | | **72** |
|  | | **Total workload / 30** | | **2,4** |
|  | | **Course ECTS Credit** | | **2** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, | 2 |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 4 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| CALCULUS I | **221811001** |

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| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 3 | 0 | 3 | 3 |

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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 | Associate degree | Compulsory |

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| **Prerequisite(s) if any** | NONE |
| **Objectives of the Course** | Perform arithmetic and algebraic operations. To be able to calculate the exponent, the root of a real number. Solving equations and inequalities. Draw line and parabola. To be able to use trigonometric ratios. Comprehension of complex numbers. To be able to comprehend the properties of exponential and logarithmic functions. |
| **Short Course Content** | Numbers, Algebra, Equations and Inequalities, Functions, Trigonometry, Complex Numbers, Logarithms |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To use numbers, algebra, equations and inequalities, functions, trigonometry, complex numbers, logarithms in their profession. | 1, 3 | 1,5,10 | A |
| **2** | To practice on these issues in the profession. | 3, 6, 10 | 1, 5, 8, 10,11 | A |

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| **Main Textbook** | 1. Anadolu Üniversitesi Yayınları Genel Matematik. Eskişehir  2. Görgülü., A. (2000) Genel Matematik. Eskişehir  3. Şenel, M. , Orhun N. , Tüzemen Ş. ( 2003) Genel Matematik. Eskişehir  4. Yıldız E. (2004) Genel Matematik. Trabzon  5. Argün Z. (2001) Temel Matematik. Ankara : Seçkin Yayınevi |
| **Supporting References** |  |
| **Necessary Course Material** | Miter, protractor, compass and calculator. |

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| **Course Schedule** | |
| **1** | Number Sets, Operations, Process Priority |
| **2** | Exponents, Radical Numbers, Absolute Value |
| **3** | Identities, 1 Equations |
| **4** | 2nd Degree Equations and Inequalities |
| **5** | Function, Numerical Functions |
| **6** | Linear Functions and their graphs |
| **7** | Polynomial Functions and their graphs |
| **8** | Mid-term exam |
| **9** | Rational and Algebraic Functions |
| **10** | Rational and Algebraic Functions |
| **11** | Trigonometry Functions |
| **12** | Complex Numbers |
| **13** | Numbers Complex Applications |
| **14** | Funtions Exponential and Logarithms |
| **15** | Funtions Exponential and Logarithms |
| **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 |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  | 1 | 1 | 1 |
|  | 2 | 5 | 10 |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 2 | 6 | 12 |
| Final Exam | 14 | 3 | 42 |
| Studying for Final Exam | 14 | 1 | 14 |
|  | **Total workload** | | **80** |
|  | **Total workload / 30** | | **2,666666667** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 5 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, | 3 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| PHYSICAL | **221811002** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to teach the basic principles of physics and to gain the ability to calculate by supporting the concepts with experiments. |
| **Short Course Content** | Unit systems, vectors, balance and equilibrium conditions, laws of motion, work, power, energy, heat and temperature, flow in channels and pipes, pressure loss. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Basic physical quantities and units are understood and their transformations are made. | 1,3,7,10 | 1,5,10 | A |
| **2** | The concepts of work, power and energy are known and expressed through their relations. | 1,3,7,10 | 1,5,10 | A |
| **3** | Static and dynamic systems can be distinguished. | 1,3,7,10 | 1,5,10 | A |
| **4** | Calculations related to thermal and system systems are made. | 1,3,7,10 | 1,5,10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Scientific Principles of Technology, SARI, İ., DOMBAYCI A., Gazi Kitabevi, 2006, ANKARA |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

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| --- | --- |
| **Course Schedule** | |
| **1** | Unit Systems |
| **2** | Vectors, Force and Moment |
| **3** | Equilibrium and Equilibrium Conditions |
| **4** | Finding the Center of Gravity |
| **5** | Laws of Motion |
| **6** | Work, Power, Energy |
| **7** | Heat and temperature |
| **8** | Midterm |
| **9** | Heat Transfer and Types of Heat Transfer: Conduction, Convection and Radiation |
| **10** | Heat Transfer and Types of Heat Transfer: Conduction, Convection and Radiation |
| **11** | Types of Heat Transfer: Conduction, Convection and Radiation |
| **12** | Basic Fluid Properties, Flow Types and Flow Calculation |
| **13** | Flow in Channels and Pipes |
| **14** | Pressure drop |
| **15** | Pressure drop |
| **16,17** | Final Exams |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **76** |
|  | **Toplam iş yükü / 30** | | **2,53** |
|  | **Dersin AKTS Kredisi** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering | 5 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 2 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, | 4 |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| MEASURING TECHNIQUE | **221811003** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | With this course, the student will be able to make all kinds of physical and electrical measurements. |
| **Short Course Content** | Basic concepts of measurement, measurement errors, measuring instruments, dimensional measurements, temperature and pressure measurements, and electrical measurements. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Can explain measurement terms. | 1, 2, 6, 8 | 1, 8 | A |
| **2** | Can calculate error percentages in measuring instruments. | 1, 6, 8 | 1, 5, 8, 10 | A, D |
| **3** | Can make physical and electrical measurements. | 1, 6, 10 | 1, 5, 8, 10 | A, D |

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| **Main Textbook** | Ölçme Tekniği, Prof.Dr.Osman F. Genceli  Elektrik ve Elektronik Ölçmeleri, Prof.Dr.Halit Pastacı |
| **Supporting References** | Ölçme Tekniği, Prof.Dr. Tezcan ŞEKERCİOĞLU, Birsen Yayınevi |
| **Necessary Course Material** | Computer and projector |

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| --- | --- |
| **Course Schedule** | |
| **1** | Basic concepts and terms in measurement |
| **2** | Base and derived dimensions and units |
| **3** | Measurement errors and error analysis |
| **4** | Direct and indirect measurement |
| **5** | Measuring instruments |
| **6** | Size measurement |
| **7** | Pressure measurement |
| **8** | Mid-Term Exam |
| **9** | Flow measurement |
| **10** | Temperature measurement |
| **11** | Mass measurement |
| **12** | Volume measurement |
| **13** | DC electrical measurements |
| **14** | AC electrical measurements |
| **15** | Electrical and electronic measurements |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework | 1 | 8 | 8 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 2 |
|  | **Total workload** | | **87** |
|  | **Total workload / 30** | | **2,9** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 4 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 2 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, | 5 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. | 3 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 1 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| BASIC INSTALLATION | **221811004** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | With this course, students will gain competencies in sheet metal and pipe work in order to carry out mechanical installation work in energy facilities. |
| **Short Course Content** | Sheet metal cutting, soldering, and centering; threading, countersinking and spigot on copper, steel, aluminum and plastic pipes, cutting and assembling pipes |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Cutting and joining sheets | 3, 6 | 1, 8, 10 | A |
| **2** | Joining steel, copper, aluminum and plastic pipes | 3, 6 | 1, 8, 10 | A |
| **3** | Getting to know mechanical installation concepts and technologies | 3, 6 | 1, 8, 10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Sıhhi Tesisat - Cavit SIDAL |
| **Supporting References** | Teknik Tesisat El Kitabı – Prof. Dr. Muhiddin CAN vd. |
| **Necessary Course Material** | Computer and projector |

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| --- | --- |
| **Course Schedule** | |
| **1** | Installation overview |
| **2** | Installation materials |
| **3** | Sheet metal work (cutting, clamping, soldering, spot center) |
| **4** | Cutting steel pipes, threading steel pipes |
| **5** | Cutting and reaming copper pipes |
| **6** | Flaming and countersinking copper pipes, bending |
| **7** | Joining copper pipes with brazing, record and press |
| **8** | Mid-Term Exam |
| **9** | Joining aluminum pipes |
| **10** | Joining plastic pipes |
| **11** | Inspection of plumbing |
| **12** | Plumbing equipment and supplies |
| **13** | Heating installation equipment and supplies |
| **14** | Inspection of heating system |
| **15** | Inspection of natural gas installation |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 2 | 28 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **86** |
|  | **Total workload / 30** | | **2,87** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, | 3 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| OCCUPATIONAL HEALTH AND SAFETY | **221811005** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to provide the student with the competencies necessary to ensure job security. |
| **Short Course Content** | Human health, occupational safety, occupational diseases, causes of occupational accidents and accident chain, elements that threaten safety in the environment, personal protection tools, occupational health and occupational safety legislation. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the importance of work accidents and occupational diseases | 3,9,10,11 | 1,2,8 | A |
| **2** | Being able to understand the elements that threaten security in the environment | 3,9,10,11 | 1,2,8 | A |
| **3** | Understanding Occupational Diseases | 3,9,10,11 | 1,2,8 | A |
| **4** | Understanding the effects of accidents on the workforce and economy | 3,9,10,11 | 1,2,8 | A |
| **5** | Understanding the occupational health and safety legislation | 3,9,10,11 | 1,2,8 | A |

|  |  |
| --- | --- |
| **Main Textbook** | GEREK, N., Worker Health and Occupational Safety, Anadolu University Publications, Eskişehir, 2004. Open education publications lecture notes |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Human health, occupational safety |
| **2** | Injuries and Occupational Diseases |
| **3** | Elements that threaten safety in the environment (Biological, chemical and physical threats) |
| **4** | Work accidents and their causes |
| **5** | Elements that threaten security in buildings (plumbing, heating and electrical installations) |
| **6** | Workplace safety (Workplace order, hand tools and electrical tools and machines |
| **7** | Personal protective equipment |
| **8** | Midterm |
| **9** | Personal protection tools |
| **10** | First aid |
| **11** | Protective devices installed on machines |
| **12** | Occupational Diseases (Physical, chemical and biological factors) |
| **13** | Measures to be taken against occupational diseases, accident and injury analysis |
| **14** | Legislation |
| **15** | Legislation |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **76** |
|  | **Toplam iş yükü / 30** | | **2,53** |
|  | **Dersin AKTS Kredisi** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 5 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, | 4 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 2 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| BASIC INFORMATION AND COMMUNICATION TECHNIQUES | **221811006** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | NONE |
| **Objectives of the Course** | Providing basic computer training |
| **Short Course Content** | Computer hardware, software and basic operating system training |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To have theoretical and practical knowledge about basic information technologies. | 1, 4 | 1, 2, 5,6,11 | A,D |
| **2** | Knowledge of hardware and software. | 1, 4 | 1, 2, 5, 6,11 | A,D |
| **3** | Raising awareness about information security | 10 | 1, 2, 5,6,11 | A,D |

|  |  |
| --- | --- |
| **Main Textbook** | MS OFFICE BOOK |
| **Supporting References** | Slides Related to Course Contents |
| **Necessary Course Material** | Projection, Computer |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Computing |
| **2** | Hardware units of the computer |
| **3** | Operation of a computer |
| **4** | Examination of the hardware units of computers in a laboratory environment |
| **5** | Windows Operating Systems |
| **6** | Installing the Windows Operating System |
| **7** | Computer Viruses |
| **8** | Midterm Exams |
| **9** | Microsoft Word |
| **10** | Microsoft Word |
| **11** | Microsoft Excel |
| **12** | Microsoft Powerpoint |
| **13** | Microsoft Access |
| **14** | Computer Networks and the Internet |
| **15** | Computer Networks and the Internet |
| **16,17** | Final exams |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 10 | 2 | 20 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  | 1 | 1 | 1 |
|  | 1 | 5 | 5 |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 2 | 5 | 10 |
| Final Exam | 14 | 2 | 28 |
| Studying for Final Exam | 14 | 1 | 14 |
|  | **Total workload** | | **79** |
|  | **Total workload / 30** | | **2,63** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 25 |
| Homework | 25 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, | 5 |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 4 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| MATERIAL SCIENCE | **221811007** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 3 | 0 | 3 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to be able to recognize the types of materials used in the industrial field, to understand the basic properties of materials, to learn the properties of alloys, and to choose materials for application. |
| **Short Course Content** | Classification of materials, mechanical properties of materials, properties of metals and alloys, application of material selection |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Can classify materials | 2 | 1, 8, 10 | A |
| **2** | Can understand the basic mechanical properties of materials. | 2, 3 | 1, 8, 10 | A, D |
| **3** | Can understand heat treatments and their effects on material properties. | 2, 3, 10 | 1, 8, 10 | A, D |
| **4** | Can recognize engineering alloys. | 3, 10 | 1, 8, 10 | A, D |
| **5** | Can determine the material preference for the application. | 3, 10 | 1, 8, 10 | A |

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| **Main Textbook** | Malzeme Bilimi ve Mühendisliği, W.F.SMİTH, Çev;Nihat KINIKOĞLU |
| **Supporting References** | Malzeme Bilgisi, Y.Güngör, Beta Yayınevi |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Material definition and classification of industrial materials |
| **2** | Atomic Bond |
| **3** | Crystal structures and defects |
| **4** | Physical and chemical properties of materials |
| **5** | Mechanical properties of materials |
| **6** | Mechanical properties of materials |
| **7** | Iron-carbon steels |
| **8** | Mid-Term Exam |
| **9** | Iron-carbon steels |
| **10** | Non-ferrous alloys and applications |
| **11** | Non-ferrous alloys and applications |
| **12** | Ceramics, polymers and composite materials |
| **13** | Ceramics, Polymers and composite materials |
| **14** | Basic electrical-electronic materials |
| **15** | Energy transmission and distribution materials |
| **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,….) |  |  |  |
| Homework | 1 | 8 | 8 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1 | 14 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **94** |
|  | **Total workload / 30** | | **3,13** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| HEATING SYSTEMS | **221811008** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 3 | 0 | 3 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to provide students with competencies regarding heater installation, mobile heating installation and commissioning of the heating system. |
| **Short Course Content** | General description of heating systems, heat loss calculation, types of heating devices, making the installation ready for operation. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Can calculate heat loss. | 4 | 1, 8, 10 | A |
| **2** | Can select circuit elements and heating devices for heating installations. | 4, 3 | 1, 8, 10 | A |
| **3** | Can activate heating systems. | 4, 3 | 1, 8, 10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Isıtma Tesisatı, ISISAN Yayınları  Isıtma tekniği, Uğur Köktürk |
| **Supporting References** | Isıtma, Havalandırma ve İklimlendirme Tekniği (Uğur KÖKTÜRK)  Isıtma Sistemleri Deneysan Leaflets |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Description of heating systems |
| **2** | Heat need, thermal comfort, central and individual heating systems |
| **3** | Heat transfer types and heat transfer calculations from building components |
| **4** | Heat loss calculation |
| **5** | Heat loss calculation |
| **6** | Selection of pipes, heaters and devices |
| **7** | Heaters |
| **8** | Mid-Term Exam |
| **9** | Heater mounting brackets - Radiator valves |
| **10** | Floor heating boilers |
| **11** | Boiler installations - Chimney connection |
| **12** | Combi appliances |
| **13** | Mobile heating |
| **14** | Plastic sheathed pipe installation - Mobile installation heater installation |
| **15** | Testing the installation - Commissioning the system |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1 | 14 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **86** |
|  | **Total workload / 30** | | **2,87** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 4 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| ENERGY AND ENVIRONMENT | **221811009** |

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| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 3 | 0 | 3 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to establish the relationship between energy resources and the environment, to create environmental awareness in students, and to ensure that the concept of sustainability is acquired for energy and environmental issues. |
| **Short Course Content** | The effects of energy resources on the environment, the concept of energy and environmental sustainability, the environmental pollution effect of energy consumption, the protection of energy and the environment. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Can correlate between energy and environment. | 9,11 | 1, 8, 10 | A, D |
| **2** | Can learn the sustainability for energy and environment. | 3, 5 | 1, 8, 10 | A, D |
| **3** | Can understand the relation between human and environment. | 9, 10, 11 | 1, 8, 10 | A, D |
| **4** | Can learn the importance of energy efficiency. | 1, 3, 9 | 1, 8, 10 | A, D |

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| **Main Textbook** | | Çevre ve Enerji, Oğuz Özdemir , Mehmet Erdoğan , Naim Uzun , Yasin Eren , Rasim Önder , Ahmet Özsoy , İbrahim Üçgül , Ufuk Elibüyük , Aysel Aydın Kocaeren , M. Yunus Pamukoğlu, Nobel Yayımcılık |
| **Supporting References** | | İleri Enerji Sistemleri ve Çevre, Prof. Dr. Sadık Kakaç, Doç. Dr. Nilay Sezer Uzol |
| **Necessary Course Material** | | Computer and projector |
| **Course Schedule** | | |
| **1** | What is energy? | |
| **2** | Alternative energy systems | |
| **3** | Wind eenrgy and production methods | |
| **4** | Solar eenrgy and production methods | |
| **5** | Geothermal eenrgy and production methods | |
| **6** | Other energy power plants | |
| **7** | Human and environment | |
| **8** | Mid-Term Exam | |
| **9** | Energy production and environment | |
| **10** | Energy production and environment | |
| **11** | Sustainability | |
| **12** | Renewable energy systems and environment relation | |
| **13** | Renewable energy systems and environment relation | |
| **14** | Renewable energy systems and environment relation | |
| **15** | Renewable energy systems and environment relation | |
| **16,17** | Final Exam | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework | 1 | 8 | 8 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **94** |
|  | **Total workload / 30** | | **3,13** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 3 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 3 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| GENERAL AND TECHNICAL COMMUNICATION | **221811010** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | NONE |
| **Objectives of the Course** | The aim of this course is to teach communication methods and to increase the student's communication skills. |
| **Short Course Content** | Definition of communication, its importance, individual and mass communication methods |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Know the principles of communication | 10, 11 | 1, 2, 5, 11 | A |
| **2** | Can set goals and set goals in communication. | 10, 11 | 1, 2, 5,11 | A |
| **3** | People who may encounter in business life (employee, employer, customer, etc.) communicate successfully in relationships | 10, 11 | 1, 2, 5,11 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Anadolu Üniversitesi Yayınları, SÖZLÜ VE SÖZSÜZ İLETİŞİM- Aralık 2018-Eskişehir  Anadolu Üniversitesi Yayınları, İKNA EDİCİ İLETİŞİM - Ağustos 2018-Eskişehir |
| **Supporting References** | Slides Prepared by the Instructor Regarding the Course Content, Lecture Notes |
| **Necessary Course Material** | Blackboard- Projection, Computer |

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| --- | --- |
| **Course Schedule** | |
| **1** | Definitions and importance of communication |
| **2** | Purpose and elements of communication |
| **3** | Internal communication |
| **4** | Close communication, Remote communication |
| **5** | Types of individual communication |
| **6** | Verbal and non-verbal communication, written communication |
| **7** | Technical communication |
| **8** | MIDTERM EXAM |
| **9** | Mass communication |
| **10** | Formal communication |
| **11** | Types of organizational communication |
| **12** | Communication efficiency |
| **13** | Persuasive communication |
| **14** | Communication failures and their consequences |
| **15** | Project-presentation, communication applications |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 2 | 6 | 12 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 2 | 10 | 20 |
|  | **Total workload** | | **76** |
|  | **Total workload / 30** | | **2,5333333** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 3 |

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 DEPARTMENT OF ELECTRİCİTY AND ENERGY ALTERNATİVE ENERGY SOURCES TECHNOLOGY PROGRAM**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| BEHAVIORAL SCIENCES | **221811011** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 1 | 2 | 0 | 2 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | NONE |
| **Objectives of the Course** | To inform students about the basic concepts of behavioral sciences and to introduce them to the importance of behavior in their work and normal lives. |
| **Short Course Content** | Basic concepts related to Behavioral Sciences. Branches of science that fall within the scope of Behavioral Sciences. Behavioral sciences that contribute to the study of organizations. The place of behavioral sciences in practice. Behavioral Approaches. Individual Basic Model of Behavior. Needs as the root cause of behaviors. Plane of behavior. Status and role behaviors. The place and importance of social institutions in human behavior. Interpersonal communication. Groups. Culture. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Getting to know the society in which one lives | 10, 11 | 1, 2, 5, 11 | A |
| **2** | Getting to know yourself better | 10, 11 | 1, 2, 5,11 | A |
| **3** | To improve knowledge of the effects of society on our behavior | 10, 11 | 1, 2, 5,11 | A |

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| --- | --- |
| **Main Textbook** | Anadolu University Press, Introduction to Behavioral Sciences- 2013-Eskişehir |
| **Supporting References** | Slides Prepared by the Instructor Regarding the Course Content, Lecture Notes |
| **Necessary Course Material** | Projection, Computer |

|  |  |
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| **Course Schedule** | |
| **1** | Introduction of the course |
| **2** | Introduction to sociology |
| **3** | Introduction to Psychology |
| **4** | Emerging sociology and hypothetical approaches |
| **5** | Emerging sociological and hypothetical approaches |
| **6** | Motives and Emotions |
| **7** | Sensation and Perception |
| **8** | MIDTERM EXAM |
| **9** | Community and community structure, |
| **10** | Community life, Community groups, Family |
| **11** | Classification of communities |
| **12** | Learning & Culture |
| **13** | Personality Psychology and Personality Theories |
| **14** | Social Influences on Behavior, Attitudes |
| **15** | Social Influences on Behavior, Attitudes |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 2 | 8 | 16 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 2 | 8 | 16 |
|  | **Total workload** | | **76** |
|  | **Total workload / 30** | | **2,533333** |
|  | **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 4 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 5 |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| TURKISH LANGUAGE II | **221012005** |

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| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 2 | 0 | 2 | 2 |

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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 | Associate degree | Compulsory |

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| **Prerequisite(s) if any** | NO |
| **Objectives of the Course** | To show the richness of Turkish by informing students about the development and current situation of Turkish, to gain a national language awareness, to ensure that they can speak and write Turkish correctly. To compare Turkish language with major languages in the world. To compare the language policies of major languages with the language policy of Turkish language. To give speech training. |
| **Short Course Content** | Definition and properties of language; languages of the world and the place of Turkish among the world languages; historical development of Turkish language and the development of Western Turkish; Atatürk's studies and views on Turkish language; phonetics; spelling rules and punctuation; language policies. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student explains the language families of the world and the place of Turkish among the world languages. | 1 | 1 | A |
| **2** | Defines the rules of Turkish. | 1 | 1, 5 | A |
| **3** | Recognizes sound events. | 1 | 1, 5, 11 | A |
| **4** | Applies spelling rules. | 3, 10 | 5, 6 | A |
| **5** | Compose written and oral compositions. | 3, 10 | 6 | A |
| **6** | Uses Turkish correctly. | 3, 9, 10, 11 | 6, 11 | A |

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| **Main Textbook** | *Türk Dili I-II*, ed. Ferruh Ağca, Eskişehir Osmangazi Üniversitesi Yayınları, 2022**.** |
| **Supporting References** | *Üniversiteler İçin Türk Dili*, Bayrak Yayınları, İstanbul, 1997. |
| **Necessary Course Material** |  |

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| **Course Schedule** | |
| **1** | Elements of a Sentence |
| **2** | Elements of a Sentence |
| **3** | Sentence Types |
| **4** | Sentence Types |
| **5** | Punctuation Marks |
| **6** | Punctuation Marks |
| **7** | Punctuation Marks |
| **8** | Mid-Term Exam |
| **9** | Written Expression |
| **10** | Written Expression |
| **11** | Oral Expression |
| **12** | Oral Expression |
| **13** | Spelling Rules |
| **14** | Spelling Rules |
| **15** | Expression Disorders |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 4 | 4 | 16 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 4 | 4 |
|  | **Total workload** | | **56** |
|  | **Total workload / 30** | | **1,86** |
|  | **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 2 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 4 |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| THE HISTORY OF THE PRINCIPLES AND THE REVOLUTIONS OF ATATURK II | **221012001** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 2 | 0 | 2 | 2 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| **Prerequisite(s) if any** | None |
| **Objectives of the Course** | The Students can understand; the victory at the Liberation War; The Treaty of Lausanne which paved the way for the foundation of the republic; The Principles and the Revolutions of Atatürk. Then the course will also provide the students to understand democracy and modern concepts |
| **Short Course Content** | The Armistice of Mudanya, The abolition of the dynasty, The Treaty of Lausanne, the foundation of the Republic, the abolution of Caliphate, the Constitution of 1924, the attempts for the multi-party system, the uprising of Şeyh Sait, the changing of alphabet, university reform, the revolutions of Atatürk towards all sides of life, interior and exterior politics of Atatürk, the principles of Atatürk, the developments in Turkey and world after the death of Atatürk |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Students,  learn the Armistice of Mudanya and the Treaty of Lausanne | 1, 10, 11 | Expression | Class Attendance |
| **2** | understand the abolition of dynasty and the Caliphate; foundation of the republic | 1, 10, 11 | Expression | Class Attendance |
| **3** | learn the attempts for multi-party system during Atatürk’s era | 1, 10, 11 | Expression | Class Attendance |
| **4** | see the revolutions on education and law which dedicate to create a secular and modern social structure | 1, 10, 11 | Expression | Class Attendance |
| **5** | learn the revolutions related with socio-economic life | 1, 10, 11 | Expression | Class Attendance |
| **6** | understand the foreign policy of Atatürk | 1, 10, 11 | Expression | Class Attendance |
| **7** | learn the principles of Atatürk | 1, 10, 11 | Expression | Class Attendance |
| **8** | understand the politics in Turkey after the death of Atatürk | 1, 10, 11 | Expression | Class Attendance |

|  |  |
| --- | --- |
| **Main Textbook** | Turan Şerafettin, *Türk Devrim Tarihi, C.I-II*, İstanbul, 1991–1995 |
| **Supporting References** | Ateş, Toktamış, Türk Devrim Tarihi, İstanbul: Der Yayınları, 2001.  Aybars, Ergün, Türkiye Cumhuriyeti Tarihi, İzmir: Ercan Kitabevi, 2000.  Eroğlu, Hamza, Türk İnkılap Tarihi, Ankara: Savaş Yayınları, 1990.  Kongar, Emre, Devrim Tarihi ve Toplumbilim Açısından Atatürk, İstanbul: Remzi Kitabevi, 1999.  Selek, Sebahattin, Anadolu İhtilali, İstanbul: Kastaç Yayınları, 1987.  Timur, Taner, Türk Devrimi ve Sonrası, Ankara: İmge Kitabevi, 1997. |
| **Necessary Course Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | The Armistice of Mudanya; the abolition of dynasty and the Peace Treaty of Lausanne |
| **2** | The Foundation of the Republic and the abolition of the Caliphate |
| **3** | The Attempts for multi-party system; Assassination of İzmir and the movement in Menemen |
| **4** | The Revolutions on Law System: The constitutions of New Turkish State |
| **5** | The Revolutions on Law System: The acceptence of Civil Code and the regulations fort he woman rights |
| **6** | The Revolutions on Education and Cultural Life: The unity of education, the acceptance of new letters, the reforms on language, history and the other fields |
| **7** | The Revolutions for Economic Life: The abolition of aşar, reforms on agriculture and industry, etatism |
| **8** | Mid-Term Exam |
| **9** | The Changes on Social Life: the closing of tekkes and zawiyahs, the law of having surname, weekend holiday |
| **10** | The Foreign Policy of Atatürk: The problems of Etabli and Mosul, relations with foreign states |
| **11** | The Foreign Policy of Atatürk: membership to the United Nations, the Balkan Agreement, Montreux Convention, The Pact of Sadabad |
| **12** | The Principles of Atatürk: Republicanism, Secularism, Revolutionism, Nationalism, Populism, Etatism |
| **13** | The Supplementary Principles of Atatürk |
| **14** | The Interior and exterior developments during the period of İsmet İnönü |
| **15** | The Period of Democratic Party |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 8 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 8 | 8 |
|  | **Total workload** | | **60** |
|  | **Total workload / 30** | | **2** |
|  | **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 3 |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| ENGLİSH II | **221012006** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 2 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| English | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | NO |
| **Objectives of the Course** | Students can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. They can describe in simple terms aspects of their background, immediate environment and matters in areas of immediate need.  Students can understand standard speech related to areas of most immediate personal relevance (e.g. personal and family information, shopping, local geography and employment) and can catch the main point in simple messages and announcements.  Students can read and find specific, predictable information in simple everyday material such as advertisements, prospectuses and timetables.  Students can handle very short social exchanges, even though they cannot usually keep the conversation going of their own accord.  They can write relating to matters in areas of immediate need, linking a series of phrases and sentences with connectors. |
| **Short Course Content** | The aim of the course is to teach students basic grammar rules in elementary level, give them speaking, writing, reading and listening knowledge of English. It consists of content and activities aimed at having students acquire Elementary Level English language skills according to evaluation and reference system of The Common European Framework. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student becomes familiar with basic grammar rules in English. | 1 | 1, 5, 11 | A |
| **2** | Analyzes English dialogues. | 1 | 1, 4, 5, 11 | A |
| **3** | Understands and explains an English text at the level. | 4, 10 | 1, 4, 5, 11 | A |
| **4** | Communicates in written and spoken English. | 4, 10 | 1, 4, 5, 11 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Warwick L., Williams D. (2020). *Roadmap A2 Students’ Book & Workbook*. Pearson Education Limited. |
| **Supporting References** | Murphy, R., (2004). *English Grammar in Use*, Cambridge University Press, |
| **Necessary Course Material** | Öğrenci ders kitabı, çalışma kitabı, bilgisayar, web-kamera, hoparlör, sözlük, akıllı telefon |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | 6A past simple (regular verbs) - prepositions - describe an event - understand reviews - understanding adjectives  6B past simple (irregular verbs) - describe a good weekend - understand a narrative - understanding the order of events |
| **2** | 6C past simple (questions) - verbs + prepositions - did you? - ask and answer questions - write a short story - using subject pronouns  6D give and accept an apology |
| **3** | 7A countable and uncountable nouns; some, any, lots of and a lot of - food and drink - vowel sounds; connected speech - describe food shopping items - understand announcements - listening for special information |
| **4** | 7B how much/how many? + quantifiers – food containers - sentence stress - create a dish - write a social media post - giving opinions and reasons |
| **5** | 7C comparative adjectives - describing places to eat - compare places to eat - follow instructions - understanding instructions  7D order in a café |
| **6** | 8A present continuous - geography -ing - describe a travel experience - write a guide - using adjectives  8B present simple and present continuous - weather - contractions - describe the weather - understand a news report - understanding connected speech |
| **7** | 8C superlative adjectives - phrases describing travel - compare places, activities and transport - understand a short article - understanding paragraph topics  8D make a phone call |
| **8** | Mid-Term Exam |
| **9** | 9A should/shouldn’t - health - give advice - understand a short talk - dealing with unknown words |
| **10** | 9B be going to - future plans - discuss your goals for the future - write an informal email - organising an email to a friend |
| **11** | 9C would like/want - activities with go - tonic stress; weak forms - describe what you want to do - understand a blog post - understanding because and so  9D make arrangements and invitations |
| **12** | 10A verb patterns - housework - sentence stress - interview people - write a personal profile - expressing likes and dislikes |
| **13** | 10B have to/don’t have to - clothes - word stress; have to - play a guessing game - understand an opinion article - identifying opinions |
| **14** | 10C present perfect simple - technology - contractions - talk about past experiences - understand an interview  - understanding time expressions 10D give a compliment |
| **15** |  |
| **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 | 2 | 2 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 6 | 6 |
|  | **Total workload** | | **76** |
|  | **Total workload / 30** | | **2,4** |
|  | **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, | 2 |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 4 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

** ESOGÜ SİVRİHİSAR VOCATİONAL SCHOOL  
 DEPARTMENT OF ELECTRİCİTY AND ENERGY ALTERNATİVE ENERGY SOURCES TECHNOLOGY PROGRAM**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| CALCULUS II | **221812001** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Being able to operate with vectors. Understanding the concept of limit and continuity. Being able to use derivatives and integrals to solve problems. |
| **Short Course Content** | Vectors, complex numbers, matrices, derivatives and their applications, integrals and their applications. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Being able to perform four operations on vectors. To be able to operate with complex numbers and to perform polar and Cartesian transformations of complex numbers. To be able to solve derivative problems. Solving integration problems | 1, 3 | 1,5,10 | A |
| **2** | To practice these issues in your profession. | 3, 6, 10 | 1, 5, 8, 10,11 | A |

|  |  |
| --- | --- |
| **Main Textbook** | 1. Anadolu Üniversitesi Yayınları Genel Matematik. Eskişehir  2. Görgülü., A. (2000) Genel Matematik. Eskişehir  3. Şenel, M. , Orhun N. , Tüzemen Ş. ( 2003) Genel Matematik. Eskişehir  4. Yıldız E. (2004) Genel Matematik. Trabzon  5. Argün Z. (2001) Temel Matematik. Ankara : Seçkin Yayınevi |
| **Supporting References** |  |
| **Necessary Course Material** | Square square, protractor, compass and calculator. |

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| **Course Schedule** | |
| **1** | Vectors |
| **2** | Vectors |
| **3** | Definition of complex numbers, vector representation, four operations of complex numbers in Cartesian form |
| **4** | Polar and Cartesian transformations of complex numbers |
| **5** | Polar and Cartesian transformations of complex numbers |
| **6** | Matrices |
| **7** | Matrices |
| **8** | Midterm |
| **9** | Derivatives and applications |
| **10** | Derivatives and applications |
| **11** | Derivatives and applications |
| **12** | Integration and its applications |
| **13** | Integration and its applications |
| **14** | Integration and its applications |
| **15** | Integration and its applications |
| **16,17** | Final Exams |

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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 |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 2 | 5 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 2 | 6 | 12 |
|  | **Total workload** | | **80** |
| **Total workload / 30** | | **2,666666667** |
| **Course ECTS Credit** | | **3** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
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|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering | 5 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, | 3 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

** ESOGÜ SİVRİHİSAR VOCATİONAL SCHOOL  
 DEPARTMENT OF ELECTRİCİTY AND ENERGY ALTERNATİVE ENERGY SOURCES TECHNOLOGY PROGRAM**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| BASIC ENERGY SOURCES | **221812002** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 2 | 0 | 2 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is aimed to teach students basic energy sources. |
| **Short Course Content** | Energy resources, fossil energy resources, global climate change, solar energy, wind energy, hydraulic resources and their importance for Turkey, storable and renewable energy source, wave energy, geothermal energy, bioenergy |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learning about energy and how energy spreads | 1,2,3,5,8,9 | 1,5 | A |
| **2** | Learning the types of energy | 3,5,8,9 | 1,5 | A |
| **3** | Ability to explain the sustainability of conventional energy resources | 3,5,8,9 | 1,5 | A |
| **4** | Having information about fossil fuels | 3,5,8,9 | 1,5 | A |
| **5** | Having information about renewable energy sources | 1,2,3,5,8,9 | 1,5 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Öztürk, H. H. (2021). Renewable energy sources. Seçkin Publishing House.Kademli, M. (2020). Basic Energy Sources. Seçkin Publishing House. |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | General information about basic energy sources |
| **2** | General information about basic energy sources |
| **3** | Thermal Power Plants |
| **4** | Hydraulic Energy and Hydroelectric Power Plants |
| **5** | Nuclear energy |
| **6** | Geothermal energy |
| **7** | Bio-mass, Bio-diesel and Bio-gas |
| **8** | Midterm |
| **9** | Solar Energy and Photovoltaic Batteries |
| **10** | Solar Energy and Photovoltaic Batteries |
| **11** | Wind Energy and Wind Turbines |
| **12** | Wave Energy and Turbines |
| **13** | Hydrogen Energy |
| **14** | Comparison of Energy Sources |
| **15** | Comparison of Energy Sources |
| **16,17** | Final Exams |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **76** |
| **Toplam iş yükü / 30** | | **2,53** |
| **Dersin AKTS Kredisi** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 3 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 5 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. | 5 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| ELECTRICAL ENERGY TRANSMISSION AND DISTRIBUTION | **221812003** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is aimed to provide information about the structure, features and elements of energy transmission and distribution systems, to develop skills in the use and maintenance of the elements and to teach problem solutions related to network calculations. |
| **Short Course Content** | Energy transmission and distribution networks, transmission and distribution line elements, calculations and problem solutions regarding transmission and distribution networks |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Ability to explain the structure and properties of the energy transmission system | 2,3,5,8,9 | 1,5,10 | A |
| **2** | Recognize transmission and distribution line elements and be able to explain the use, maintenance and installation of these elements. | 2,3,5,8,9 | 1,5,10 | A |
| **3** | Ability to calculate transmission and distribution networks | 2,3,5,8,9 | 1,5,10 | A |
| **4** | Ability to explain the features and functions of distribution networks | 2,3,5,8,9 | 1,5,10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Tosun, İ. (2007). Energy Transmission and Distribution. Istanbul: Birsen Publishing House. |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Current, Voltage and Power in Electrical Energy Systems |
| **2** | Current, Voltage and Power in Electrical Energy Systems |
| **3** | Electrical Energy Transmission and Distribution Networks |
| **4** | Electrical Energy Transmission and Distribution Networks |
| **5** | Electrical Energy Distribution and Transformer Selection |
| **6** | Disconnectors, breakers and busbars |
| **7** | Overhead Line Conductors and Underground Cables |
| **8** | Midterm |
| **9** | Protection Systems in Electrical Energy Transmission and Distribution |
| **10** | Protection Systems in Electrical Energy Transmission and Distribution |
| **11** | Electrical Energy Transmission and Distribution maintenance and installation operations |
| **12** | Electrical Energy Transmission and Distribution maintenance and installation operations |
| **13** | Transmission and distribution networks calculations |
| **14** | Protection Systems in Electrical Energy Transmission and Distribution |
| **15** | Protection Systems in Electrical Energy Transmission and Distribution |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Total workload** | | **90** |
|  | **Total workload / 30** | | **3** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 5 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 5 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. | 3 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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 DEPARTMENT OF ELECTRİCİTY AND ENERGY ALTERNATİVE ENERGY SOURCES TECHNOLOGY PROGRAM**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| BASIC ELECTRICITY AND ELECTRONICS | **221812004** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to teach basic electrical concepts and electrical and electronic circuit elements. |
| **Short Course Content** | Electrical definitions, volts, amperes, power, electrical circuits, electrical measuring instruments, power circuits, electrical circuit elements, electronic circuit elements, electrical safety precautions, |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Knows the definitions of electricity. | 1,2,3 | 1,5 | A |
| **2** | Provides advice on minor electrical malfunctions. | 1,2,3 | 1,5 | A |
| **3** | Knows the types and uses of electric motors. | 1,2,3 | 1,5 | A |
| **4** | Gains experience in electrical work safety. | 1,2,3 | 1,5 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Yaşar B., İsmail S., Electrical and Electronics Information, MEB 2003 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definitions and units |
| **2** | Basic electrical circuits |
| **3** | Features of power circuits |
| **4** | electrical measuring devices |
| **5** | electrical circuit elements |
| **6** | electrical circuit elements |
| **7** | Resistor types, resistor color codes |
| **8** | Midterm |
| **9** | Resistor connections |
| **10** | Resistor connections |
| **11** | Electronic circuit elements |
| **12** | Electronic circuit elements |
| **13** | Electric motors |
| **14** | Electrical energy calculations |
| **15** | Electrical energy calculations |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Total workload** | | **90** |
|  | **Total workload / 30** | | **3** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 5 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| ENERGY POWER PLANT DESIGN | **221812005** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 2 | 0 | 2 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is aimed to teach students energy production methods and to exemplify production plant designs. |
| **Short Course Content** | Energy sources, fossil energy sources, energy production methods, energy production plants, plant designs |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learning about fossil fuels | 3,5,8,9 | 1,8 | A |
| **2** | Having information about renewable energy sources | 1,2,3,5,8,9 | 1,8 | A |
| **3** | Learning energy production methods | 3,5,8,9 | 1,8 | A |
| **4** | Having knowledge about production plant design, planning and installation | 3,5,8,9,10 | 1,15 | A |
| **5** | Ability to design an appropriate energy production plant for a consumption point | 1,2,3,5,8,9 | 1,5,8 | E |

|  |  |
| --- | --- |
| **Main Textbook** | Kademli, M. (2020). Temel Enerji Kaynakları. Seçkin Yayınevi. |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | General information about fundamental energy sources |
| **2** | Conventional energy power plants |
| **3** | Renewable energy power plants |
| **4** | Design of wind power plant |
| **5** | Design of solar power plant |
| **6** | Design of geothermal power plant |
| **7** | Hydrogen energy and usage |
| **8** | Mid-Term Exam |
| **9** | Things to consider in power plant design |
| **10** | Site assessment and restrictions |
| **11** | Assessments and suggesstions |
| **12** | Detection of available technology and system design |
| **13** | Example |
| **14** | Project study (research) |
| **15** | Project study (report) |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) | 1 | 14 | 14 |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Total workload** | | **90** |
|  | **Total workload / 30** | | **3** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 20 |
| Report | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 3 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 5 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. | 5 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| BASICS OF NUCLEAR ENERGY | **221812006** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To understand the formation of nuclear reactions and their conversion into energy by recognizing the atomic structure. To have information about accidents and their consequences. |
| **Short Course Content** | Types of energy. The importance of nuclear energy. Radiation and radioactivity. Fission and Fusion. Nuclear energy sources, nuclear fuels. Nuclear power reactors. Nuclear waste. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Explains nuclear reactions by exemplifying the structure of the atom. | 1 | 1, 8, 10 | A |
| **2** | It can show the difference between fission and fusion reactions. | 1, 3 | 1, 8, 10 | A |
| **3** | Gain information about the structure and energy production of nuclear power plants | 3, 5, 8 | 1, 8, 10 | A |
| **4** | Be able to explain accidents and their consequences by realizing the importance of radiation. | 10, 11 | 1, 8, 10 | A |

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| --- | --- |
| **Main Textbook** | Nükleer Enerji, Muray, L. R. ve Holbert, (2015) |
| **Supporting References** | Nükleer Enerji Mühendisliğine Giriş, Palme Yayın Evi, Edt: O. Zabunoğlu |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to nuclear energy (basic concepts) |
| **2** | Atomic structure and atomic models |
| **3** | Radiation and radioactivity. |
| **4** | Radioactive decays. Alpha, Beta and Gamma decays. |
| **5** | Interaction of radiation with matter. |
| **6** | Biological effects of radiation. |
| **7** | Fission and fusion. |
| **8** | Mid-Term Exam |
| **9** | Nuclear models |
| **10** | Production and use of nuclear fuels |
| **11** | Energy production in nuclear power reactors |
| **12** | Nuclear reactor types and their frequency of use in the world |
| **13** | Nuclear accidents |
| **14** | Nuclear security |
| **15** | The situation of nuclear energy in the world and in Turkey |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **93** |
|  | **Total workload / 30** | | **3,1** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 4 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. | 4 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 5 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| COOLING SYSTEMS | **221812007** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Understanding cooling methods, recognizing the elements of the cooling system and understanding the working principle. |
| **Short Course Content** | Cooling methods, basic mechanical cooling, refrigerants and oils, cooling circuit auxiliary elements, household refrigerators |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Basic concepts of refrigeration and P-h diagram, refrigeration cycles | 1, 7 | 1, 8, 10 | A |
| **2** | Recognizes the basic mechanical cooling system and cooling cycles. | 3, 9 | 1, 8, 10 | A |
| **3** | Recognizes the elements of the cooling system. | 3, 9 | 1, 8, 10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Soğutma Tekniği ve Uygulamaları, R. Yamankaradeniz, İ.Horuz, S. Coşkun  Soğutma, Kemal Taner |
| **Supporting References** | Soğutma İlkeleri Deneysan Leaflets |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to the cooling system |
| **2** | Heat and temperature concepts |
| **3** | Cooling methods, (Mechanical, Chemical, Physical Methods) |
| **4** | Refrigerants |
| **5** | Cooling system oils |
| **6** | Basic mechanical cooling system, working principle |
| **7** | Cooling cycles |
| **8** | Mid-Term Exam |
| **9** | Compressors |
| **10** | Condensers |
| **11** | Evaporators, expansion valves |
| **12** | Cooling system auxiliary elements |
| **13** | Cooling system applications |
| **14** | Cooling system malfunctions |
| **15** | Cooling system calculations |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **93** |
|  | **Total workload / 30** | | **3,1** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 2 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, | 3 |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| ENTREPRENEURSHIP | **221812008** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The entrepreneurship course aims to learn topics related to the concepts of enterprise and entrepreneur, to explain the key concepts in entrepreneurship, and to build a bridge between the theoretical framework and applications in daily life. |
| **Short Course Content** | Entrepreneur, entrepreneurship, business and management, examples of successful and unsuccessful entrepreneurship |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding who an entrepreneur is and who he is not | 10,11 | 1,2,5 | A |
| **2** | Ability to explain the basic concepts of entrepreneurship | 10,11 | 1,2,5 | A |
| **3** | Ability to draw the framework of entrepreneurship with real-life examples | 9,10,11 | 1,2,5 | A |
| **4** | Be aware of different aspects and dimensions of entrepreneurship | 9,10,11 | 1,2,5 | A |
| **5** | Learning business management and classification | 9,10,11 | 1,2,5 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Entrepreneurship and Small Business Management (Orhan KÜÇÜK) |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Entrepreneur, entrepreneurship |
| **2** | Entrepreneurship and Related Concepts |
| **3** | Types of Entrepreneurship |
| **4** | Characteristics of Successful Entrepreneurs and Development of Entrepreneurship Culture |
| **5** | Success and Failure Factors in Entrepreneurship with Examples from the World and Türkiye |
| **6** | Research on the Enterprise Establishment Process and Feasibility Study (General Framework) |
| **7** | The importance of entrepreneurship in the economy |
| **8** | Midterm |
| **9** | Business and management |
| **10** | Business and management |
| **11** | Classification of businesses |
| **12** | Classification of businesses |
| **13** | Support for Entrepreneurs |
| **14** | Support for Entrepreneurs |
| **15** | Support for Entrepreneurs |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **86** |
|  | **Toplam iş yükü / 30** | | **2,87** |
|  | **Dersin AKTS Kredisi** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, | 4 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 5 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| HYDROGEN AND FUEL CELL TECHNOLOGY | **221812009** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Giving information about hydrogen production, storage and applications. |
| **Short Course Content** | Structural properties of hydrogen, production methods of hydrogen, storage and transportation systems, working principle of fuel cells, fuel cell types and applications |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Knows the basic concepts and principles of hydrogen energy and its applications. | 1 | 1, 8, 10 | A |
| **2** | Knows the basic concepts of fuel cells and this new technology. | 3, 5, 8 | 1, 8, 10 | A |
| **3** | Calculates the efficiency of energy conversion systems. | 5, 8, 10 | 1, 8, 10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Yakıt pili teknolojisi, Prof. Dr. Durmuş Kaya ve Prof. Dr. H. Hüseyin Öztürk  Hidrojen ve Yakıt Pili Teknolojisi, Prof. Dr. Durmuş Kaya ve Prof. Dr. H. Hüseyin Öztürk, Doç. Dr. Muhammet Kayfeci |
| **Supporting References** | Yenilenebilir Enerji Kaynakları ve Kullanımı, Doç. Dr. H. Hüseyin Öztürk |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | The importance of hydrogen for the world |
| **2** | Structural properties of hydrogen |
| **3** | Hydrogen production methods |
| **4** | Conversion of hydrogen into energy |
| **5** | Hydrogen storage and transportation systems |
| **6** | Hydrogen technologies and latest developments |
| **7** | Advantages and disadvantages of hydrogen energy |
| **8** | Mid-Term Exam |
| **9** | Introduction to fuel cells |
| **10** | Working principle of fuel cells, other parts of the system |
| **11** | Fuel cell types, PEM (Proton exchange membrane fuel cells) |
| **12** | Fuel cell types, direct Methanol, Phosphoric Acid, Bio and other fuel cell systems |
| **13** | Fuel cell types, solid oxide fuel cells |
| **14** | Fuel cell application |
| **15** | Fuel cell application |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework | 1 | 11 | 11 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **90** |
|  | **Total workload / 30** | | **3** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 4 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. | 4 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| BUSINESS ETHICS | **221812010** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 2 | 0 | 2 | 3 |

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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 | Associate degree | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | NONE |
| **Objectives of the Course** | The aim of this course is to teach to gain competencies related to professional ethics. |
| **Short Course Content** | To examine the concepts of ethics and morality, to examine the factors that play a role in the formation of morality, to examine professional ethics and to examine the concept of social responsibility |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Examines the concepts of ethics and morality | 10, 11 | 1, 5, 8,12,13 | A |
| **2** | Complies with the principles of professional ethics | 10, 11 | 1, 5, 8,12,13 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Anadolu Üniversitesi Yayınları İş Etiği. Eskişehir |
| **Supporting References** |  |
| **Necessary Course Material** | Projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Examine the concepts of ethics and morality |
| **2** | Examine the concepts of ethics and morality |
| **3** | Examine the ethical systems |
| **4** | Examine the ethical systems, investigate the factors that play a role in the formation of morality |
| **5** | Investigate the factors that play a role in the formation of morality |
| **6** | Examine the ethics of profession |
| **7** | Examine the ethics of profession |
| **8** | Mid-term exam |
| **9** | Examine the ethics of profession |
| **10** | Examine the ethics of profession |
| **11** | Analyzing the results of corruption and unethical behavior in professional life professional |
| **12** | Analyzing the results of corruption and unethical behavior in professional life professional |
| **13** | Examine the concept of social responsibility |
| **14** | Examine the concept of social responsibility |
| **15** | Examine the concept of social responsibility |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 1 | 6 | 6 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Total workload** | | **78** |
|  | **Total workload / 30** | | **2,6** |
|  | **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 5 |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| CAREER PLANNING | **221812011** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 2 | 2 | 0 | 2 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to help students plan their own careers. |
| **Short Course Content** | Career-related concepts, Career planning, Stages of the career planning process, Career planning models, CV writing, Job interview |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Ability to distinguish between career-related concepts | 10,11 | 1,2,5 | A |
| **2** | Ability to explain career planning steps | 10,11 | 1,2,5 | A |
| **3** | Ability to determine career goals | 10,11 | 1,2,5 | A |
| **4** | Ability to prepare own CV and business letters | 10,11 | 1,2,5 | A |
| **5** | Gaining interview skills | 10,11 | 1,2,5 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Öz Temel, K. (2020). Career planning and development |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

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| --- | --- |
| **Course Schedule** | |
| **1** | Career-related concepts |
| **2** | Career development theories |
| **3** | What is career planning? What are its features and principles? |
| **4** | Stages of the career planning process |
| **5** | Stages of the career planning process |
| **6** | Career planning models Goal setting in career planning |
| **7** | World career trends |
| **8** | Midterm |
| **9** | CV preparation |
| **10** | Resume types, CV format and examples, points to consider when preparing a CV |
| **11** | Cover letter Reference letter |
| **12** | Job interview purposes, methods and types |
| **13** | Preparation for the interview and interview stages |
| **14** | Situations that may be encountered during interviews; question types, body language-bodily signs |
| **15** | Situations that may be encountered during interviews; question types, body language-bodily signs |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **76** |
|  | **Toplam iş yükü / 30** | | **2,53** |
|  | **Dersin AKTS Kredisi** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, | 4 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 5 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| COMPUTER AIDED DRAWING | **221813001** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 2 | 2 | 3 | 5 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | With this course, students will gain computer-aided two-dimensional drawing competencies. |
| **Short Course Content** | Using basic drawing commands, using correction and editing commands, making perspective drawings, and printing in the preferred CAD program. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Drawing with basic commands. | 1, 6, 2 | 1, 6, 11 | A, D |
| **2** | To make 2D drawing applications. | 1, 6, 2 | 1, 6, 10, 11 | A, D |
| **3** | Practicing perspective drawing | 1, 6, 2 | 1, 6, 10, 11 | A, D |

|  |  |
| --- | --- |
| **Main Textbook** | Uygulamalarla AUTOCAD, İsmail Ovalı, Cemal Esen |
| **Supporting References** | Examples compiled from various sources |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Initial settings of the program |
| **2** | Basic CAD concepts |
| **3** | Basic drawing commands (line, construction line, polyline, layered lines etc.) and applications |
| **4** | Basic drawing commands (rectangle, circle, arc, polygon, ellipse etc.) and applications. |
| **5** | Basic editing commands (erase, copy, move, trim, rotate, mirror etc.) and applications. |
| **6** | Basic editing commands (offset, array, scale, stretch, lengthen etc.) and applications |
| **7** | Sample applications |
| **8** | Mid-Term Exam |
| **9** | Basic drawing and editing commands (Hatch, text, extend, break, chamfer, fillet etc.) |
| **10** | Dimensioning applications |
| **11** | Isometric drawing |
| **12** | Take printout |
| **13** | Sample applications |
| **14** | Basic Plumbing Drawing-Applications |
| **15** | Basic Plumbing Drawing-Applications |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework | 1 | 20 | 20 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 2 | 28 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2,5 | 35 |
|  | **Total workload** | | **141** |
|  | **Total workload / 30** | | **4,7** |
|  | **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, | 3 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| ELECTROMECHANICAL CONTROL CIRCUITS | **221813002** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 2 | 2 | 3 | 4 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to provide students with the competencies required to install electrical control circuits used in air conditioning and cooling systems. |
| **Short Course Content** | Household and commercial type refrigerant control circuits, industrial type refrigeration control circuits, individual-central air conditioning systems control circuits, vehicle air conditioning control circuits |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Installing home type refrigerator control circuits | 2,3,5,6,9 | 1,3,6 | A |
| **2** | Installing commercial type cooling control circuits | 2,3,5,6,9 | 1,3,6 | A |
| **3** | Installing industrial type cooling control circuits | 2,3,5,6,9 | 1,3,6 | A |
| **4** | Establishing an Individual/Central Air Conditioning control circuit | 2,3,5,6,9 | 1,3,6 | A |
| **5** | Establishing a mobile air conditioning/cooling control circuit | 2,3,5,6,9 | 1,3,6 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Electrical Control Circuits (Prof. Dr. İlhami Çolak, Assoc. Prof. Dr. Ramazan Bayındır) |
| **Supporting References** |  |
| **Necessary Course Material** | IKS Electrical Control Training Set |

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| **Course Schedule** | |
| **1** | Thermostat, defrost and fan electrical connection circuits, Compressor starting circuits |
| **2** | Single and double door refrigerator control circuits |
| **3** | No-frost cooler control circuit |
| **4** | Dispenser and sherbet type cooler control circuits |
| **5** | Showcase type and ice machine cooler control circuits |
| **6** | Water chiller control circuit |
| **7** | Cold storage control circuit |
| **8** | Midterm |
| **9** | Split and package type air conditioning control circuits |
| **10** | Roof type air conditioning control circuit |
| **11** | Central air handling unit control circuit |
| **12** | Automobile type air conditioning control circuit |
| **13** | Minibus and bus type air conditioning control circuits |
| **14** | Pickup truck type refrigerated cooling control circuit |
| **15** | Pickup truck type refrigerated cooling control circuit |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 3 | 2 | 6 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **106** |
|  | **Toplam iş yükü / 30** | | **3,53** |
|  | **Dersin AKTS Kredisi** | | **4** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 5 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 4 |
| **6** | To have skills in various measurement methods and measurement applications, | 4 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| THERMODYNAMICS AND HEAT TRANSFER | **221813003** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 3 | 0 | 3 | 4 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Understanding thermodynamic variables, thermodynamic laws and important cycles. Learning types of heat transfer (Conduction, Convection, Radiation) and heat transfer analysis. |
| **Short Course Content** | Laws of thermodynamics and basic types of heat transfer |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Knows the laws of thermodynamics. | 1, 7 | 1, 8, 10 | A |
| **2** | Understand thermodynamic cycles. | 1, 7, 10 | 1, 8, 10 | A |
| **3** | Know the types of heat transfer (conduction, convection, radiation). | 1, 7, 10 | 1, 8, 10 | A |

|  |  |
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| **Main Textbook** | Mühendislik Yaklaşımıyla Termodinamik-Yunus ÇENGEL  Isı ve Kütle Transferi-Yunus ÇENGEL |
| **Supporting References** | Lecture notes compiled from various sources |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Basic concepts of thermodynamics |
| **2** | Energy transfer by heat, work and mass |
| **3** | Properties of pure substances (T-v, P-v, P-T diagrams) |
| **4** | The first law of thermodynamics: closed systems |
| **5** | The first law of thermodynamics: closed systems |
| **6** | The first law of thermodynamics: control volumes |
| **7** | The second law of thermodynamics |
| **8** | Mid-Term Exam |
| **9** | Second law of thermodynamics (Carnot cycles and heat pump) |
| **10** | Entropy |
| **11** | Exergy and availability |
| **12** | Power and cooling cycles |
| **13** | Types of heat transfer and heat transfer by conduction |
| **14** | Heat transfer by convection |
| **15** | Radiation heat transfer and heat exchangers |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 2 | 28 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2,5 | 35 |
|  | **Total workload** | | **107** |
|  | **Total workload / 30** | | **3,57** |
|  | **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 4 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, | 5 |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| ELECTRICITY PRODUCTION WITH WIND ENERGY | **221813004** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 3 | 0 | 3 | 4 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is aimed to recognize the systems that produce electricity from wind energy and to gain skills in system assembly and testing. |
| **Short Course Content** | Based on wind turbines required for wind energy production; Load analysis, Wind speed and direction measurements, Determining the appropriate turbine height, Basic connections, Determining the number of storage devices, Creating inverter capacity and connections, and Installing the meter group. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Ability to measure wind speed and direction | 2,3,5,6,8,9 | 1,5,10 | A |
| **2** | Determining the Proper Turbine Height | 2,3,5,6,8,9 | 1,5,10 | A |
| **3** | Turbine power calculation | 2,3,5,6,8,9 | 1,5,10 | A |
| **4** | Battery number calculation | 2,3,5,6,8,9 | 1,5,10 | A |
| **5** | Determining inverter capacity and making connections | 2,3,5,6,8,9 | 1,5,10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Yarımkaya, D. (2021). Alternative Energy Sources. Ankara: Nobel Academic Publishing. H.Hüseyin Öztürk Renewable Energy Resources and their use Teknik Publishing House 2007 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Basic information of wind energy, historical development and classification of wind turbines |
| **2** | Wind Source and Characteristics |
| **3** | Wind energy measurement and data analysis |
| **4** | Determining the appropriate Turbine height, Determining the installation location |
| **5** | Basic connections and carrier system |
| **6** | Basic connections and carrier system |
| **7** | Battery number calculation |
| **8** | Midterm |
| **9** | Charge controller connection |
| **10** | Battery grouping |
| **11** | Inverter capacity determination |
| **12** | Creating an inverter connection |
| **13** | Creating network inputs/outputs |
| **14** | Meter group connection |
| **15** | Meter group connection |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **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,….) | 4 | 2 | 8 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 12 | 12 |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **106** |
|  | **Toplam iş yükü / 30** | | **3,53** |
|  | **Dersin AKTS Kredisi** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 5 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 5 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, | 3 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. | 4 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 5 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| ELECTRICITY PRODUCTION WITH SOLAR ENERGY | **221813005** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 2 | 2 | 3 | 4 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is aimed to teach electricity production methods with solar energy. |
| **Short Course Content** | Solar energy, Solar radiation reaching the earth, Flat solar collectors, Solar hot water systems, Solar energy cooling, Solar power plants, Electricity production with photovoltaic systems, |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the place and importance of solar energy among renewable energy sources | 2,3,5,8,9 | 1,5 | A |
| **2** | Understanding the characteristics of solar energy and the areas where it can be used | 2,3,5,8,9 | 1,5 | A |
| **3** | Recognizing the elements of solar water heating systems and understanding their functioning | 2,3,5,8,9 | 1,5 | A |
| **4** | Ability to learn other application areas of solar energy such as cooling, drying, electricity generation. | 2,3,5,8,9 | 1,5 | A |

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| **Main Textbook** | H. Hüseyin Öztürk, Solar Energy and Applications Birsen Publishing House. İlhan Ceylan, A. Etem Gürel, Solar Energy Systems and Design, Dora Publishing |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Solar radiation |
| **2** | Solar Energy Potential in Turkey |
| **3** | The importance and features of Solar Energy |
| **4** | Solar Energy water heating systems |
| **5** | Solar Energy water heating systems |
| **6** | Solar Power Plants |
| **7** | Solar Power Plants |
| **8** | Midterm |
| **9** | Solar Power Plants |
| **10** | Solar Cells |
| **11** | Photovoltaic Process |
| **12** | Grid-Free Solar Cell Systems |
| **13** | Grid Connected Solar Cell Systems |
| **14** | Application Examples |
| **15** | Application Examples |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 4 | 2 | 8 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 12 | 12 |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **120** |
|  | **Toplam iş yükü / 30** | | **4** |
|  | **Dersin AKTS Kredisi** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 5 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. | 5 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| ENERGY MANAGEMENT | **221813006** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | With this course, students will be provided with basic competencies regarding the efficient and economical use of energy. |
| **Short Course Content** | Energy management, increasing energy efficiency, energy saving, alternative energy sources. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Being able to recognize Turkey's general energy situation | 3,5,8,9 | 1,2,5 | A |
| **2** | Increasing energy efficiency | 3,5,8,9 | 1,2,5 | A |
| **3** | Energy saving in electrical systems and lighting | 3,5,8,9 | 1,2,5 | A |
| **4** | Ability to recognize alternative energy sources | 3,5,8,9 | 1,2,5 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Energy Saving and Renewable Energy Resources (Elect. Engineer Yusuf Yaman) |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Classification of energy types |
| **2** | Turkey's General Energy Situation |
| **3** | Turkey's Energy Consumption |
| **4** | Energy Management |
| **5** | Energy efficiency |
| **6** | Energy efficiency |
| **7** | Energy saving methods |
| **8** | Midterm |
| **9** | Renewable energy sources |
| **10** | Renewable energy sources |
| **11** | Usable energy, storable energy |
| **12** | Areas of use of energy |
| **13** | Areas of use of energy |
| **14** | Waste energy recovery in industrial applications |
| **15** | Waste energy recovery in industrial applications |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Total workload** | | **90** |
|  | **Total workload / 30** | | **3** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. | 3 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| BORON TECHNOLOGY | **221813007** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 3 | 0 | 3 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Explaining the importance of boron and its minerals in terms of engineering in Turkey and the world, and conveying the methods of boron production, storage and waste disposal. |
| **Short Course Content** | General information about boron, production of boron compounds, boron reserve relations in Turkey and the world, areas of use of boron, use of boron in the field of energy |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Briefly define the properties of boron mineral. | 5 | 1, 8, 10 | A |
| **2** | Explains the production methods of boron and its compounds. | 5, 9 | 1, 8, 10 | A |
| **3** | Describes the high-technology boron products produced today. | 5, 9 | 1, 8, 10 | A |
| **4** | Defines the use of boron in the energy field. | 9 | 1, 8, 10 | A |
| **5** | Knows the methods of evaluating and destroying boron waste. | 10, 11 | 1, 8, 10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Acaroğlu M., Alternatif Enerji Kaynakları, Seçkin Yayınları, 2007. |
| **Supporting References** | Boron: The Fifth Element (Vol. 20). Spring. |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | General information about boron compounds |
| **2** | General characteristics and formations of boron mineral reserves in Türkiye and the world |
| **3** | Sodium Borates, Dehydration and Drying of Borax |
| **4** | Sodium Borates, Dehydration and Drying of Borax |
| **5** | Facilities where producing boron and its compounds in Turkey |
| **6** | Borax production: borax production from tincal in Turkey |
| **7** | Borax production: borax production from tincal in Turkey |
| **8** | Mid-Term Exam |
| **9** | Boron Nitride and production methods |
| **10** | Boron Hydride and its use in fuel cells |
| **11** | Use of Boron in the Energy Field |
| **12** | Use of Boron in the Energy Field |
| **13** | Solar energy storage, solar cell protector |
| **14** | Evaluation and disposal of boron waste |
| **15** | Evaluation and disposal of boron waste |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **93** |
|  | **Total workload / 30** | | **3,1** |
|  | **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 3 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 4 |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| TECHNICAL ENGLISH | **221813008** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 3 | 0 | 3 | 3 |

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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** |
| English | Associate degree | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | In this course, it is aimed to provide the student with basic technical definitions and concepts and basic vocational language skills. |
| **Short Course Content** | English technical terms and short articles on topics such as renewable energy sources, photovoltaic energy, biomass, wind energy, geothermal and nuclear energy. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learn English terms related to technical subjects. | 1, 10 | 1, 8 | A, D |
| **2** | Reads and understands vocational English texts. | 1, 10 | 1, 8 | A, D |

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| --- | --- |
| **Main Textbook** | Technical English for renewable energy / Open Educational Resources for online course of Technical English for renewable energy / Rozália Szabó |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Renewable energy and rural development |
| **2** | Renewable energy and rural development |
| **3** | The carbon footprint |
| **4** | Photovoltaic energy |
| **5** | Photovoltaic energy |
| **6** | Biomass |
| **7** | Biomass |
| **8** | Mid-Term Exam |
| **9** | Wind energy |
| **10** | Wind energy |
| **11** | Air Source Heat Pumps |
| **12** | Ground source heat pumps |
| **13** | Geothermal energy |
| **14** | Nuclear energy |
| **15** | Nuclear energy |
| **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,….) |  |  |  |
| Homework | 1 | 8 | 8 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **101** |
|  | **Total workload / 30** | | **3,37** |
|  | **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| WELDING TECHNOLOGY | **221813009** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 3 | 0 | 3 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to teach welding processes, welding principles and to gain proficiency in welded manufacturing methods. |
| **Short Course Content** | Weld types, welding positions, welding defects and welding inspection methods |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learning how to do gas fusion welding | 3 | 1, 8 | A |
| **2** | Learning how to do electric arc welding | 3 | 1, 8 | A |
| **3** | Learning to weld under gas atmosphere (MIG/MAG) | 3 | 1, 8 | A |
| **4** | Learning to TIG weld | 3 | 1, 8 | A |
| **5** | Welding defects and inspection methods | 6, 10 | 1, 8 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Kaynak Teknolojisi, J. W. Giacinho |
| **Supporting References** | Malzeme Bilgisi ve Muayenesi, M. Y. Gürleyik |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Definition of welding, safety in welding processes |
| **2** | Welding metallurgy |
| **3** | Principles of joining by welding |
| **4** | Oxidation and protective environment |
| **5** | Basic welding methods |
| **6** | Use of welding in industry, welding positions |
| **7** | Oxy-Gas welding |
| **8** | Mid-Term Exam |
| **9** | Oxy-Gas welding |
| **10** | Electric arc welding |
| **11** | MIG/MAG welding |
| **12** | TIG welding |
| **13** | Welding defects |
| **14** | Weld inspection methods |
| **15** | Weld inspection methods |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **93** |
|  | **Total workload / 30** | | **3,1** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 2 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, | 2 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| ENERGY STORAGE | **221813010** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 3 | 3 | 0 | 3 | 3 |

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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 | Associate degree | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The purpose of this course is to teach students the storage methods of mechanical energy, electrical energy, magnetic energy and thermal energy. |
| **Short Course Content** | The concept of energy and energy storage, mechanical energy storage, electrical and magnetic energy storage, thermal energy storage and examples of energy storage |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Can learn the working principles of energy storage technologies. | 1, 3 | 1, 8 | A |
| **2** | Can has the ability to determine the storage technology of energy obtained from different energy sources. | 1, 3, 9 | 1, 8 | A |
| **3** | Can have knowledge about alternative energy storage techniques. | 1, 3, 9 | 1, 8 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Enerji Depolama Teknolojileri, Doç. Dr. Behçet Kocaman |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | What is storage? |
| **2** | Development of energy storage worldwide |
| **3** | Development of energy storage in Türkiye |
| **4** | Energy storage methods |
| **5** | Energy storage methods |
| **6** | Reason for energy storage |
| **7** | Methods of heat energy storage |
| **8** | Mid-Term Exam |
| **9** | Energy storage in liquids |
| **10** | Energy storage in solids |
| **11** | Electricity energy storage |
| **12** | Electromechanical energy conversion and storage |
| **13** | Comparison of storage systems |
| **14** | Environmental impact |
| **15** | Energy storage with renewable energy sources |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1 | 14 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **86** |
|  | **Total workload / 30** | | **2,86** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| AIR CONDITIONING TECHNOLOGY | **221814001** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 2 | 2 | 3 | 4 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | With this course, students will be provided with competencies regarding the basic physical concepts required for air conditioning and refrigeration applications. |
| **Short Course Content** | Basic physical quantities, Work, power and energy concepts  Simple heat transfer problems, flow rate and pressure loss values P-h diagram and Psychrometric diagram |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Ability to explain basic physical quantities, work, power and energy concepts | 1,3,7 | 1,5 | A |
| **2** | Solving simple heat transfer problems and calculating flow rate and pressure loss values | 1,3,7 | 1,5,10 | A |
| **3** | Ability to use P-h diagram and Psychrometric diagram | 1,3,7 | 1,5,10 | A |

|  |  |
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| **Main Textbook** | Cooling Techniques and Applications (R. YAMANKARADENİZ, İ.HORUZ, S. COŞKUN) |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Basic physical and chemical concepts, Unit systems |
| **2** | Latent and sensible heat, temperature and temperature measurement |
| **3** | Temperature unit conversions |
| **4** | Pressure and pressure measurement, Gas and gas laws |
| **5** | work, power, energy |
| **6** | Heat transfer and types of heat transfer: Conduction, convection and radiation |
| **7** | Types of heat transfer: Conduction, convection and radiation |
| **8** | Midterm |
| **9** | Basic fluid properties, flow types, continuity and energy equation, flow in channels and pipes |
| **10** | Definition of refrigeration, types of refrigeration, basic mechanical compression refrigeration cycle and application areas, examples |
| **11** | Refrigeration cycles shown on P-h diagram |
| **12** | P-h Diagram |
| **13** | P-h Diagram |
| **14** | Psychrometric Diagram |
| **15** | Psychrometric Diagram |
| **16,17** | Final Exams |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 4 | 2 | 8 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 3 | 4 | 12 |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **120** |
|  | **Toplam iş yükü / 30** | | **4** |
|  | **Dersin AKTS Kredisi** | | **4** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering | 4 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, | 5 |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| HYBRID ENERGY SYSTEMS | **221814002** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 4 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Explanation of hybrid systems, analysis and integrated processes of hybrid systems, teaching advantages and disadvantages, demonstration of sample hybrid applications. |
| **Short Course Content** | Hybrid energy systems, hybrid system components, solar-wind hybrid system, solar-wind-hydrogen-hybrid system, application examples |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Can understand that energy sources can be used together. | 1, 3 | 1, 8 | A |
| **2** | Knows the working principle of hybrid systems. | 3, 5, 9 | 1, 8 | A |
| **3** | Recognize system equipment and integration method. | 7, 8 | 1, 8 | A |
| **4** | Can determine which energy sources to use by taking into account the climate conditions of the region. | 5, 8, 9 | 1, 8 | A |

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| **Main Textbook** | Enerji Sistemlerinin Kararlılığı, Neriman Şerifoğlu, Didem Erdoğan |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Basic concepts |
| **2** | Hybrid energy systems |
| **3** | Hybrid energy systems |
| **4** | Components of hybrid systems |
| **5** | Components of hybrid systems |
| **6** | Advantageous and availability of hybrid systems |
| **7** | Challenges and disadvantageous |
| **8** | Mid-Term Exam |
| **9** | Solar-wind hybrid system |
| **10** | Solar-wind-hydrogen hybrid system |
| **11** | Hybrid energy system design parameters |
| **12** | Hybrid energy system design parameters |
| **13** | Examples around the world |
| **14** | Examples in Türkiye |
| **15** | Overview and evaluation |
| **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,….) | 3 | 2 | 6 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 2 | 28 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2,5 | 35 |
|  | **Total workload** | | **113** |
|  | **Total workload / 30** | | **3,77** |
|  | **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
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| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 3 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. | 4 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| ENERGY PRODUCTION WITH BIOMASS | **221814003** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 4 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To provide detailed information about the formation and sources of biomass energy, environmental effects, energy production methods, and biomass use in Turkey and the World. |
| **Short Course Content** | Formation of biomass energy and conversion of biomass to energy |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding biomass energy and technology. | 1 | 1, 8 | A |
| **2** | To enable the use waste and biomass as a renewable energy source by using thermochemical and biochemical processes. | 5, 7 | 1, 8 | A |
| **3** | To gain the ability to monitor new technologies and solve problems by understanding the world energy problem. | 9, 11 | 1, 8 | A |

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| **Main Textbook** | Biyoyakıt üretimi- Prof.Dr. Hüseyin ÖZTÜRK - Prof.Dr. Durmuş KAYA |
| **Supporting References** | Lecture notes compiled from various sources |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Formation of biomass and its evaluation from an energy perspective |
| **2** | Biomass resources in the world and in Turkey |
| **3** | Energy potential of organic waste and biomass |
| **4** | Energy crops and forests |
| **5** | Methods and techniques for using biomass for energy purposes |
| **6** | Methods of obtaining energy from biomass (thermochemical methods, direct combustion, gasification) |
| **7** | Methods of obtaining energy from biomass (thermochemical methods, direct combustion, gasification) |
| **8** | Mid-Term Exam |
| **9** | Methods of obtaining energy from biomass (biochemical methods, alcohol fermentation) |
| **10** | Methods of obtaining energy from biomass (biochemical methods, alcohol fermentation) |
| **11** | Methods of obtaining energy from biomass (biochemical methods, anaerobic fermentation, biophotolysis) |
| **12** | Methods of obtaining energy from biomass (biochemical methods, anaerobic fermentation, biophotolysis) |
| **13** | Methods of obtaining energy from biomass (agrochemical methods, oil transesterification) |
| **14** | The place of biofuels in the future biomass energy budget |
| **15** | Advantages and disadvantages of biomass energy |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 2 | 28 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2,5 | 35 |
|  | **Total workload** | | **107** |
|  | **Total workload / 30** | | **3,57** |
|  | **Course ECTS Credit** | | **4** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
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|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 3 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, | 2 |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 3 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| INSTALLATION AND PREVENTIVE MAINTENANCE | **221814004** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 2 | 2 | 3 | 4 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to provide students with the competencies required to perform maintenance and troubleshooting operations. |
| **Short Course Content** | Maintenance and troubleshooting, troubleshooting and maintenance in individual and central systems, Service operations, Maintenance and troubleshooting in thermal, natural gas cycle, nuclear, biomass, geothermal, wind, hydroelectric, solar power plants. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the system in which assembly and preventive maintenance will be performed | 2,3,5,6,8,9 | 1,2,6,8,10 | A |
| **2** | Maintenance and troubleshooting in individual and central air conditioning systems | 2,3,5,6,8,9 | 1,2,6,8,10 | A |
| **3** | Maintenance and troubleshooting in power generation plants | 2,3,5,6,8,9 | 1,2,6,8,10 | A |

|  |  |
| --- | --- |
| **Main Textbook** |  |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Basic concepts related to maintenance methods |
| **2** | Maintenance approaches |
| **3** | Computer-aided maintenance method systems |
| **4** | Reliability-centered maintenance |
| **5** | Maintenance and service operations |
| **6** | Maintenance in individual and central air conditioning systems |
| **7** | Maintenance in thermal power plants |
| **8** | Midterm |
| **9** | Maintenance in natural gas combined cycle power plants |
| **10** | Maintenance in nuclear power plants |
| **11** | Maintenance in biomass power plants |
| **12** | Maintenance in geothermal power plants |
| **13** | Maintenance in wind power plants |
| **14** | Maintenance in hydroelectric power plants |
| **15** | Maintenance in solar power plants |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 3 | 2 | 6 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **106** |
|  | **Toplam iş yükü / 30** | | **3,53** |
|  | **Dersin AKTS Kredisi** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 4 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 5 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, | 4 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. | 5 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 5 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| INTERNSHIP APPLICATIONS | **221814005** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 0 | 5 | 0 | 5 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Business Application |
| **Short Course Content** | Internship work |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Business Application | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 | 6, 7, 8, 10, 11, 12 | E, K |

|  |  |
| --- | --- |
| **Main Textbook** |  |
| **Supporting References** |  |
| **Necessary Course Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Internship |
| **2** | Internship |
| **3** | Internship |
| **4** | Internship |
| **5** | Internship |
| **6** | Internship |
| **7** | Internship |
| **8** | Internship |
| **9** | Internship |
| **10** | Internship |
| **11** | Internship |
| **12** | Internship |
| **13** | Internship |
| **14** | Internship |
| **15** | Internship |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 30 | 5 | 150 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam |  |  |  |
| Studying for Mid-Term Exam |  |  |  |
| Final Exam |  |  |  |
| Studying for Final Exam |  |  |  |
|  | **Total workload** | | **150** |
|  | **Total workload / 30** | | **5** |
|  | **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 100 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 3 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, | 3 |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 5 |
| **6** | To have skills in various measurement methods and measurement applications, | 3 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. | 3 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 4 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 2 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 2 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| INDUSTRIAL AUTOMATION | **221814006** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to introduce automatic control elements, ensure their use, design power and control circuits and PLC. |
| **Short Course Content** | Automatic Control, Automatic control elements, symbols, project planning of automatic control circuits. PLC |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Automatic control learning | 2,3,6,8,9 | 1,5 | A |
| **2** | Ability to use automatic control elements | 2,3,6,8,9 | 1,5 | A |
| **3** | Ability to establish power and control circuits | 2,3,6,8,9 | 1,5,6 | A |
| **4** | Ability to project power and control circuits | 2,3,6,8,9 | 1,5,6 | A |
| **5** | PLC learning | 2,3,6,8,9 | 1,5,6 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Yaşar B., İsmail S. Electrical and Electronics Information, MEB 2003, |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

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| --- | --- |
| **Course Schedule** | |
| **1** | Automatic control concepts |
| **2** | Automatic control types |
| **3** | Automatic control types |
| **4** | Automatic control elements, signal circuits and measurements |
| **5** | Automatic control circuits |
| **6** | Automation definitions |
| **7** | The importance and applications of industrial automation |
| **8** | Midterm |
| **9** | Automation in production lines and automatic machines |
| **10** | Automation in the transportation sector |
| **11** | Sensors and applications |
| **12** | First movement systems |
| **13** | PLC definitions, uses |
| **14** | PLC definitions, uses |
| **15** | PLC definitions, uses |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **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,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **90** |
|  | **Toplam iş yükü / 30** | | **3** |
|  | **Dersin AKTS Kredisi** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 4 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, | 4 |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. | 4 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| HEAT PUMPS | **221814007** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To provide sufficient information about the basic concepts of thermodynamics and the general structure, types and application areas of heat pumps. |
| **Short Course Content** | Second law of thermodynamics, Carnot cycle, refrigeration cycle, heat pump working principle and types, heat pump application areas |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learn the basic concepts of thermodynamics | 7 | 1, 8, 10 | A |
| **2** | Learn refrigeration cycles, types and applications. | 5 | 1, 8, 10 | A |
| **3** | Learn the working principle, types and applications of heat pumps. | 9, 11 | 1, 8, 10 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Heat Pump Systems, Saver H. J., John Wiley And Sons, 1983.  Soğutma Tekniği ve Isı Pompası Uygulamalar, R. Yamankaradeniz vd. |
| **Supporting References** | Heat Pumps: Theory and Service, L. Mile., Delmar Publ. Inc., 1994 |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Basic concepts of thermodynamics |
| **2** | The first and second law of thermodynamics |
| **3** | Refrigerants |
| **4** | Saf maddeler |
| **5** | Carnot cycle |
| **6** | Cooling cycles |
| **7** | Introduction and classification of heat pumps |
| **8** | Mid-Term Exam |
| **9** | Performance parameters used in heat pumps. |
| **10** | Air source heat pumps |
| **11** | Water source heat pumps |
| **12** | Ground source heat pumps |
| **13** | Heat pump system components. |
| **14** | Heat pump applications |
| **15** | Heat pump applications |
| **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 | 1 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **93** |
|  | **Total workload / 30** | | **3,1** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 3 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, | 3 |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 2 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 2 |

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**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| QUALITY MANAGEMENT SYSTEMS | 221814008 |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 3 |

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

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | NO |
| **Objectives of the Course** | The aim of this course is to gain competencies related to quality assurance and standards in business life. |
| **Short Course Content** | The concept of quality, standard and standardization, the importance of the standard in the production and service sector, management quality and standards, quality costs, problem identification and solving tools in quality, quality management systems, strategic management, process and resource management system, control diagrams and distributions. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To establish the infrastructure of the quality management system. | 3, 10 | 1,5,11,15 | A,D |
| **2** | Able to learn and apply Quality standards | 3, 8, 10 | 1,5,11,15 | A,D |
| **3** | Gain knowledge about quality management system models. | 10, 11 | 1,5,11,15 | A,D |

|  |  |
| --- | --- |
| **Main Textbook** | 1.DİLSSIZ İ.,KARTAL C.S.,Quality Assurance and Standards, Detay Publishing, Ankara, 2012.  2.BURNAK N., Total Quality Management (Statistical Process Control), Osmangazi University Publications, Eskisehir, 1997. |
| **Supporting References** | Course Content Slides, Lecture Notes |
| **Necessary Course Material** | Projection, Computer |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Quality and basic concepts |
| **2** | Quality, quality control |
| **3** | Quality assurance, total quality management and the relationships between them |
| **4** | Quality costs |
| **5** | Standard and standardization |
| **6** | Certification and accreditation |
| **7** | Calibration and metrology |
| **8** | Midterm Exam |
| **9** | Quality management systems |
| **10** | Quality management systems |
| **11** | Quality management systems |
| **12** | Quality management systems |
| **13** | Quality problem identification and solving tools |
| **14** | Process and resource management system |
| **15** | Control Diagrams and distributions |
| **16,17** | Final exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 1 | 8 | 8 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) | 1 | 2 | 2 |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 2 | 2 |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 7 | 7 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 2 | 7 | 14 |
|  | **Total workload** | | **77** |
|  | **Total workload / 30** | | **2,57** |
|  | **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering |  |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. | 4 |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, | 3 |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 2 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| HYDRAULIC AND PNEUMATIC SYSTEMS | **221814009** |

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| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 3 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Associate degree | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to explain the hydraulic and pneumatic systems used in machines, to perform hydraulic and pneumatic maintenance, and to teach the operation of hydraulic and pneumatic machines. |
| **Short Course Content** | Hydraulic laws, hydraulic circuit elements, hydraulic circuit drawing, hydraulic circuit analysis, hydraulic presses, hydraulic work machines, hydraulic measurements, hydraulic malfunctions, pneumatic definitions, pneumatic equipment, pneumatic circuit drawing, pneumatic circuit analysis, pneumatic air lines, pneumatic applications, pneumatics maintenance and malfunctions of systems |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Recognizing and connecting hydraulic elements | 1,2,3,5 | 1,5 | A |
| **2** | Hydraulic faults interpretation | 1,2,3,5 | 1,5,7 | A |
| **3** | Identifying and connecting pneumatic elements | 1,2,3,5 | 1,5,7 | A |
| **4** | Pneumatic faults interpretation | 1,2,3,5 | 1,5,7 | A |
| **5** | Ability to maintain pneumatic and hydraulic systems | 1,2,3,5 | 1,5,7 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Hydraulic and Pneumatic Systems, İsmail KARACAN, Bursa Technical Bookstore, 2000, Bursa |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Hydraulic definitions and laws |
| **2** | Hydraulic circuit elements |
| **3** | Hydraulic circuit elements |
| **4** | Hydraulic circuit drawing |
| **5** | Hydraulic circuit drawing |
| **6** | Hydraulic circuit assembly |
| **7** | Pneumatics definitions and laws |
| **8** | Midterm |
| **9** | Pneumatics definitions and laws |
| **10** | Pneumatic circuit elements |
| **11** | Pneumatic circuit elements |
| **12** | Pneumatic circuit drawing |
| **13** | Pneumatic circuit assembly |
| **14** | Pneumatic and hydraulic maintenance and troubleshooting |
| **15** | Pneumatic and hydraulic maintenance and troubleshooting |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **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,….) | 2 | 2 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1,5 | 21 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 1,5 | 21 |
|  | **Toplam iş yükü** | | **90** |
|  | **Toplam iş yükü / 30** | | **3** |
|  | **Dersin AKTS Kredisi** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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** | Ability to use sufficient theoretical and practical knowledge in the field of mathematics, science and basic engineering | 3 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, | 5 |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 3 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation and maintenance of the produced energy, | 4 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply and analyze control methods and techniques of Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, |  |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics | 3 |

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**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| GEOTHERMAL ENERGY | **221814010** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 3 |

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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 | Associate degree | Elective |

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| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Introduction of geothermal energy and its application areas, examination of geothermal energy and electricity production techniques, examination of geothermal energy potential and policies in Turkey and the World. |
| **Short Course Content** | Areas of use of geothermal energy, classification of resources, properties and geothermal energy applications. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Can make a general definition of geothermal energy. | 1 | 1, 8 | A |
| **2** | Knows how geothermal systems are used. | 5 | 1, 8 | A |
| **3** | Knows geothermal heat pump systems. | 5, 7 | 1, 8 | A |
| **4** | Knows how to produce electricity from geothermal energy. | 5, 9 | 1, 8 | A |

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| **Main Textbook** | Jeotermal Enerji Uygulamaları - Prof.Dr.Hüseyin ÖZTÜRK - Prof.Dr.Durmuş KAYA |
| **Supporting References** | Lecture notes compiled from various sources |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Definition and properties of geothermal energy |
| **2** | Formation of geothermal energy and heat source |
| **3** | Nature and distribution of geothermal energy |
| **4** | Exploration of geothermal energy and well drilling |
| **5** | Drilling fluids and completion |
| **6** | Environmental effects of geothermal energy |
| **7** | Areas of use of geothermal energy |
| **8** | Mid-Term Exam |
| **9** | Geothermal heat pump systems |
| **10** | Geothermal heat pump systems |
| **11** | Electricity production from geothermal energy |
| **12** | Electricity production from geothermal energy |
| **13** | Direct use of geothermal energy |
| **14** | Direct use of geothermal energy |
| **15** | Direct use of geothermal energy in the world |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1 | 14 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **86** |
|  | **Total workload / 30** | | **2,87** |
|  | **Course ECTS Credit** | | **3** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
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| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 2 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, |  |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, | 3 |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, | 3 |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
| **9** | Having the ability to raise awareness on Energy Systems, project management, energy sector applications, occupational safety, human and environmental safety, | 3 |
| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |

** ESOGÜ SİVRİHİSAR VOCATİONAL SCHOOL  
 DEPARTMENT OF ELECTRİCİTY AND ENERGY ALTERNATİVE ENERGY SOURCES TECHNOLOGY PROGRAM**

**COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| ENERGY ECONOMY | **221814011** |

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| **Semester** | **Number of Course Hours per Week** | | **Credit** | **ECTS** |
| **Theory** | **Practice** |
| 4 | 3 | 0 | 3 | 3 |

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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 | Associate degree | Elective |

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| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The purpose of this course is to teach students energy economics and energy cost analysis. |
| **Short Course Content** | Energy and its importance, primary energy sources and potential analyses, fuel types, world energy balance, energy conversion systems and application areas in economic sectors, cost analyses of energy production systems, environmental effects of energy production and emission analyses. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Have knowledge about cost analysis of energy production systems.. | 1, 3 | 1, 8 | A |
| **2** | Learn the economic difference between alternative energy and conventional energy sources. | 1, 3, 9 | 1, 8 | A |
| **3** | Gains knowledge about energy and economic growth. | 1, 3, 9 | 1, 8 | A |

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| **Main Textbook** | Enerji Ekonomisi, Dr. Cahit Karakuş |
| **Supporting References** | Küresel Enerji Stratejileri ve Jeopolitik, Doç. Dr. Cenk Sevim |
| **Necessary Course Material** | Computer and projector |

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| **Course Schedule** | |
| **1** | Definition of energy economy |
| **2** | Histrorical development of energy |
| **3** | Industrial revolution and important developments |
| **4** | Energy and economic growth |
| **5** | Development of energy systems |
| **6** | Roadmap of energy investments |
| **7** | Energy demand |
| **8** | Mid-Term Exam |
| **9** | Analysis of energy production costs |
| **10** | Analysis of energy transmission and distribution costs |
| **11** | Consumptin cost analysis |
| **12** | Energy and sustainable growth |
| **13** | Effect on environment and emission analysis |
| **14** | Effect on environment and emission analysis |
| **15** | Effect on environment and emission analysis |
| **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,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 1 | 14 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **86** |
|  | **Total workload / 30** | | **2,87** |
|  | **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
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|  |  |
|  |  |
| **Final Exam** | 60 |
| **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** | Ability to use sufficient theoretical and practical knowledge in the fields of mathematics, science and basic engineering | 4 |
| **2** | Electrical, electronic, electro-mechanical, hydraulic, pneumatic, etc. being able to recognize systems, |  |
| **3** | Ability to interpret data, identify and analyze problems, and develop evidence-based solutions on issues related to the field, | 4 |
| **4** | Having knowledge about computer hardware, knowing and being able to use basic office software, |  |
| **5** | To have knowledge about the production of electrical energy from conventional and renewable energy sources, transmission, distribution, installation, and maintenance of the produced energy, |  |
| **6** | To have skills in various measurement methods and measurement applications, |  |
| **7** | Ability to learn and analyze concepts related to thermodynamics, |  |
| **8** | To be able to recognize, apply, and analyze control methods and techniques for Alternative Energy Sources systems. |  |
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| **10** | Ability to access information and use research methods, embrace the importance of lifelong learning and healthy living, improve oneself by following science, technology, and professional developments, |  |
| **11** | Being aware of social responsibility, universal, social and professional ethics |  |