|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311006 | **COURSE NAME** | ENGLISH I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 3 | | 0 | 0 | | 0 | 3 | COMPULSORY (**X**) ELECTIVE ( ) | | English |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Elementary- General English. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To make students express themselves at elementary level and enable them for technical English in upper classes. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Getting the elemantary level which constitute the base of the language can contribute to better understanding of the reading materials of the students in their field. | | | | | |
| **COURSE OUTCOMES** | | | | | | At the end of the education year, students can acquire reading, writing and speaking skills at elementary level. | | | | | |
| **TEXTBOOK** | | | | | | NUMBER ONE ( elementary ) Data publications. | | | | | |
| **OTHER REFERENCES** | | | | | | Dictionaries, grammar books. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | CDs, CD player, overhead projector. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | The alphabet, To be( present), Quantity | | | | | | | | | | |
| 2 | Singulars and plurals, This/That | | | | | | | | | | |
| 3 | Simple present tense | | | | | | | | | | |
| 4 | Adverbs of frequency | | | | | | | | | | |
| 5 | Telling the time, Likes and dislikes | | | | | | | | | | |
| 6 | Have got/has got | | | | | | | | | | |
| 7 | Should ( advice ) | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | There is/there are, Present progressive, Prepositions of place | | | | | | | | | | |
| 10 | Shouldn’t, Can | | | | | | | | | | |
| 11 | Have to/has to ( obligation ) | | | | | | | | | | |
| 12 | Simple past tense ( irregular verbs ) | | | | | | | | | | |
| 13 | Be going to, comparatives-superlatives | | | | | | | | | | |
| 14 | Countable-uncountable | | | | | | | | | | |
| 15 | Should, had beter, must | | | | | | | | | | |
| 16,17 | Yarıyıl Sonu Sınavı | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 6 | 6 |
| Final exam and Preparation | 1 | 6 | 6 |
| Total Workload (Hours) |  |  | 96 |
| Total Workload (Hours)/30 |  |  | 3,2 |
| ECTS Credits of the Course |  |  | 3 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311005 | **COURSE NAME** | OCCUPATIONAL HEALTH AND SAFETY I |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** | |
| 1 | | | 2 | |  |  | | 2 | 2 | COMPULSORY (X ) ELECTIVE ( ) | | Turkish | |
| **COURSE CATEGORY** | | | | | | | | | | | | | |
| **Basic Science** | | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** | |
| X | | | |  | | | X | | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | | |
| **MID-TERM** | | | | | | | **Evaluation Type** | | | | **Quantity** | **%** | |
| 1st Mid-Term Exam | | | | 1 | 40 | |
| 2nd Mid-Term Exam | | | |  |  | |
| Quiz | | | |  |  | |
| Homework | | | |  |  | |
| Project | | | |  |  | |
| Report | | | |  |  | |
| Others (………) | | | |  |  | |
| **FINAL EXAM** | | | | | | |  | | | | 1 | 60 | |
| **PREREQUISITE(S)** | | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | | Definition of occupational health and safety, importance and basic concepts related to the subject, Occupational Safety culture, OHS legislation, Hazard sources and classification, Occupational accidents, Occupational diseases, Effects of occupational environment on employees (physical, chemical, psychosocial, etc. factors), Risk analysis, Risk Assessment, Personal Protective Equipment (PPE) | | | | | |  |
|  | | | | | |
| **COURSE OBJECTIVES** | | | | | | | To teach occupational health and safety measures and legal obligations. | | | | | |  |
|  | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | | To protect human health and to ensure safety by knowing precautions against possible accidents and occupational diseases in working life | | | | | |  |
|  | | | | | |
| **COURSE OUTCOMES** | | | | | | | 1.An ability to interpret OHS legislation   1. An ability to identify existing hazards and risks in the workplace. 2. An ability to apply the concept of risk assessment 4. Ability to choose PPE | | | | | |  |
|  | | | | | |
| **TEXTBOOK** | | | | | | | 1.Related laws and regulations 2**.** ŞENGEL G., ERDEM M.S., ÖNDER  M., KARABACAKOĞLU., **ÜNALDI T.** ve AYTEKİN O., 2016, İş  Güvenliği Uzmanlığı Sınavlarına Yönelik Çalışma Notları, Nisan Kitabevi, Eskişehir. | | | | | | |
| **OTHER REFERENCES** | | | | | | | 1. Kahya, E., 2014, **İş Güvenliği**, ESOGÜ Yayın No :246, Eskişehir.  Kahya, E., Özkar, D., 2018, İş Güvenliği, Dorlion Yayınları,Eskişehir, | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | | Computer and projection equipment | | | | | |  |
|  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | | |
| 1 |  | Course content, execution, evaluation, general information about Occupational Safety, OHS legislation | | | | | | | | | | |  |
| 2 |  | Occupational Health and Safety Culture | | | | | | | | | | |  |
| 3 |  | OHS in Turkey and in the world | | | | | | | | | | |  |
| 4 |  | National and International organizations | | | | | | | | | | |  |
| 5 |  | Adult education and communication techniques | | | | | | | | | | |  |
| 6 | Adult education and communication techniques | | | | | | | | | | | | |
| 7 |  | Basic law | | | | | | | | | | |  |
| 8 |  | Midterm | | | | | | | | | | |  |
| 9 |  | Physical risk factors | | | | | | | | | | |  |
| 10 |  | Chemical risk factors | | | | | | | | | | |  |
| 11 |  | Biological risk factors | | | | | | | | | | |  |
| 12 |  | OHS Boards | | | | | | | | | | |  |
| 13 |  | Personal protective equipment I | | | | | | | | | | |  |
| 14 | Personal protective equipment II | | | | | | | | | | | | |
| 15 | Personal protective equipment III | | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 18 | 1 | 18 |
| Total Workload (Hours) |  |  | 60 |
| Total Workload (Hours)/30 |  |  | 2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Dr. Öğr.Üyesi Tevfik ÜNALDI

**Signature**:

**Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311003 | **COURSE NAME** | CHEMISTRY I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 4 | | 0 | 0 | | 4 | 4 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkısh |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Properties and measurement of matter; atoms and the atomic theory; chemical compounds; chemical reactions; reactions in aqueous solutions; gases; thermochemistry; electrons in atoms; the periodic table; chemical bonding. liquids, solids and inter molecular forces. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main aim of the course is about knowing fundamental aspects of chemistry. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Ability to apply the knowledge of physics and chemistry | | | | | |
| **COURSE OUTCOMES** | | | | | | 1.Define matter and chemistry and state the major concerns of this science.  2.Gives examples of chemical reactions, describing the features that characterize them. | | | | | |
| **TEXTBOOK** | | | | | | Jones, L. and Atkins, P. (2000). Chemistry, 4th Edition, W.H.Freeman and Company, New York, USA. | | | | | |
| **OTHER REFERENCES** | | | | | | 1.Petrucci, R., Harwood, W.S. and Herring, F.G. (2002). General Chemistry, 8th Edition, Prentice Hall, USA.  2.Ebbing, D.D., Wentworth, R.A.D. and Birk, J.P. (1995). Introductory Chemistry, Houghton Mifflin Company, USA. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and data show | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Properties and measurement of matter | | | | | | | | | | |
| 2 | Atoms and the atomic theory | | | | | | | | | | |
| 3 | Atoms and the atomic theory | | | | | | | | | | |
| 4 | Chemical compounds chemical reactions | | | | | | | | | | |
| 5 | Reactions in aqueous solutions | | | | | | | | | | |
| 6 | Gases | | | | | | | | | | |
| 7 | Thermochemistry | | | | | | | | | | |
| 8 | Midterm exam | | | | | | | | | | |
| 9 | Electrons in atoms | | | | | | | | | | |
| 10 | The periodic table | | | | | | | | | | |
| 11 | Chemical bonding | | | | | | | | | | |
| 12 | Liquids | | | | | | | | | | |
| 13 | Solids | | | | | | | | | | |
| 14 | Inter molecular forces | | | | | | | | | | |
| 15 | Solution and their physical characteristic | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | | | | |  |
| **ACTIVITIES** | | | **Quantity** | | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | | | 14 | | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | | | 14 | | 4 | 56 |
| Homework | | |  | |  |  |
| Project (including preparation and presentation time, if any) | | |  | |  |  |
| Report (including preparation and presentation time, if any) | | |  | |  |  |
| Presentation (including preparation time) | | |  | |  |  |
| Quiz and preparation (Quiz) | | |  | |  |  |
| Midterm and preparation | | | 1 | | 10 | 10 |
| Final exam and Preparation | | | 1 | | 10 | 10 |
| Total Workload (Hours) | | |  | |  | 132 |
| Total Workload (Hours)/30 | | |  | |  | 4,4 |
| ECTS Credits of the Course | | |  | |  | 4 |
| **COURSE CODE** | 821311004 | **COURSE NAME** | | CHEMISTRY LABORATORY I | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 0 | | 0 | 2 | | 1 | 2 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | | 1 | 50 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 50 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Introduction of laboratory equipments, Determination of density, Conservation of mass, Law of definite proportions, Molar volume of a gas and determination of ideal gas constant, Relative diffusion rate of gasses, Chemical equilibrium, Metals and sulfuric acid reactions | | | | | |
| **COURSE OBJECTIVES** | | | | | | The aim of this course is to teach students how to set up an experiment related with the content of this course and to teach the basic concept in chemistry | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To provide professional qualification on this course and provide the ability to follow the knowledge in contemporary issues and the ability on research and learn scientific method and to design and set up experiment in the laboratory. | | | | | |
| **COURSE OUTCOMES** | | | | | | At the end of the course, students will be able to synthesis the knowledge on science with the content of this course and analyze and  estimate the data in the related scientific problem | | | | | |
| **TEXTBOOK** | | | | | | Laboratory notes (prepared by the department members) | | | | | |
| **OTHER REFERENCES** | | | | | | Genel Kimya Laboratuvarı (Doç.Dr.Hülya Güler, Yrd.Doç.Dr.Dursun Saraydın, Yrd.Doç.Dr. Ulvi Ulusoy) | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and data show device | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Introduction of laboratory equipments | | | | | | | | | | |
| 2 | Determination of density | | | | | | | | | | |
| 3 | Determination of density | | | | | | | | | | |
| 4 | Conservation of mass | | | | | | | | | | |
| 5 | Conservation of mass | | | | | | | | | | |
| 6 | Law of definite proportions | | | | | | | | | | |
| 7 | Law of definite proportions | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Molar volume of a gas and determination of ideal gas constant | | | | | | | | | | |
| 10 | Molar volume of a gas and determination of ideal gas constant | | | | | | | | | | |
| 11 | Relative diffusion rate of gasses | | | | | | | | | | |
| 12 | Chemical equilibrium | | | | | | | | | | |
| 13 | Chemical equilibrium | | | | | | | | | | |
| 14 | Metals and sulfuric acid reactions | | | | | | | | | | |
| 15 | Compensation Experiment | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | | | | |  |
| **ACTIVITIES** | | | **Quantity** | | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | | | 14 | | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | | | 14 | | 1 | 14 |
| Homework | | |  | |  |  |
| Project (including preparation and presentation time, if any) | | |  | |  |  |
| Report (including preparation and presentation time, if any) | | | 7 | | 1 | 7 |
| Presentation (including preparation time) | | |  | |  |  |
| Quiz and preparation (Quiz) | | |  | |  |  |
| Midterm and preparation | | |  | |  |  |
| Final exam and Preparation | | | 1 | | 14 | 14 |
| Total Workload (Hours) | | |  | |  | 63 |
| Total Workload (Hours)/30 | | |  | |  | 2.1 |
| ECTS Credits of the Course | | |  | |  | 2 |
| **COURSE CODE** | 821311012 | **COURSE NAME** | | HEALTY EATING I | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 1 | | 0 | 0 | | 0 | 1 | COMPULSORY ( ) ELECTIVE (**X**) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Within the scope of this course; the relationship between nutrition and health; the importance of healthy, adequate and balanced nutrition; types of nutrients and their importance will be covered. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To inform students about the negative effects of inadequate and unbalanced nutrition on health, foods, food groups, healthy nutrition models, the basic principles of healthy nutrition, and to gain skills in healthy and balanced menu planning. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | This course will provide the basis for students to be healthy individuals both in the professional field and in their daily lives. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. To explain the effects of nutrition on growth 2. To explain the effects of nutrition on development 3. To explain the effects of nutrition on health 4. Ranking the food groups 5. Outline the processing and storage methods of foods 6. To identify problems caused by inadequate and unbalanced nutrition | | | | | |
| **TEXTBOOK** | | | | | | Eker, H. H, Güneş Bayır, A.. 2015. Sağlıklı Beslenme, Nobel Yayınları, İstanbul. | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and projector | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | The relationship between nutrition and health | | | | | | | | | | |
| 2 | Definition of healthy, adequate and balanced nutrition | | | | | | | | | | |
| 3 | Principles of healthy eating. | | | | | | | | | | |
| 4 | Proper nutrition rules. | | | | | | | | | | |
| 5 | Food components and functions of nutrients. | | | | | | | | | | |
| 6 | Food components and functions of nutrients. | | | | | | | | | | |
| 7 | Digestion, absorption and use of food. | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Digestion, absorption and use of food. | | | | | | | | | | |
| 10 | Carbohydrates | | | | | | | | | | |
| 11 | Lipids | | | | | | | | | | |
| 12 | Proteins | | | | | | | | | | |
| 13 | Water and minerals | | | | | | | | | | |
| 14 | Vitamins | | | | | | | | | | |
| 15 | Non-nutritive substances | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  |  | X |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 1 | 14 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 1 | 1 |
| Final exam and Preparation | 1 | 1 | 1 |
| Total Workload (Hours) |  |  | 30 |
| Total Workload (Hours)/30 |  |  | 1 |
| ECTS Credits of the Course |  |  | 1 |

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311007 | **COURSE NAME** | TURKISH LANGUAGE I |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | 2 | | 0 | 0 | | 0 | 2 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | Description and features of language, languages of the world, Position of Turkish among other languages, historical development of Turkish, development of western Turkish, Atatürk’s ideas and projects on Turkish, pronunciation and punctuation, language policies. | | | | | |
| **COURSE OBJECTIVES** | | | | | The subject of the course is to expose the value of Turkish language by giving information about development of Turkish language, to gain national language awareness, to develop reading and writing skills, to compare and contrast Turkish language to other languages, to compare and contrast language policy of developed countries to Turkish language policy, to gain skill of speaking. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Develop the ability of using Turkish properly at the business life. | | | | | |
| **COURSE OUTCOMES** | | | | | Learn Turkish grammar  Gain an understanding of the position of Turkish among other languages  Gain an understanding of history of Turkish language  Gain knowledge about Turkish languages in the world  Develop the ability of using Turkish properly  Learn the language policies  Gain writing skill  Gain speaking skill  Learn sentence structure and analyzing  Be able to realize Turkish vowels  Be able to realize formation of Turkish  Be able to read and comprehend  Be able to speak simultaneously  Be able to write compositions | | | | | |
| **TEXTBOOK** | | | | | 1. Kültür, M. E., “Üniversiteler İçin Türk Dili”, Bayrak Yayınları, İstanbul, 1997. 2. “Türk Dil Yazım Kılavuzu”, TDK Yayınları, 24. baskı, Ankara, 2005 | | | | | |

|  |  |
| --- | --- |
| **OTHER REFERENCES** | 1. Kaplan, M., “Kültür ve Dil”, 8. baskı, ,Dergah Yayınları, İstanbul, 1993. 2. Fuat, M., “Dil Üstüne”, Adam Yayınları, İstanbul, 2001. 3. Ercilasun, A. B., “Başlangıçtan Yirminci Yüzyıla Türk Dili Tarihi”, Akçağ   Yayınları, 1. baskı, Ankara, 2004.   1. Aksan, D., “Türkçe’nin Gücü”, Bilgi Yayınevi, 4. baskı, Ankara, 1997. 5. Karamanlıoğlu, A., “Türk Dili”, Degah Yayınları, 3. baskı, İstanbul, 1984. 2. Anday, M. C., “Dilimiz Üstüne Konuşmalar”, YKY, İstanbul, 1996. 3. Karaağaç, G., “Dil Tarih ve İnsan”, Akçağ Yayınevi, Ankara, 2002. 4. Aksan, D., “Dil Şu Büyülü Düzen”, Bilgi Yayınevi, Ankara, 2003. 5. Banarlı, N. S., “Türkçe’nin Sırları”, 18. baskı, Kubbealtı Neşriyatı, İstanbul, 2002 |
| **TOOLS AND EQUIPMENTS REQUIRED** | DVD, VCD, projection, computer |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Definition and features of language |
| 2 | Definition and features of language |
| 3 | Languages in the world and the place of Turkish among the world languages |
| 4 | Languages in the world and the place of Turkish among the world languages |
| 5 | The historical development of the Turkish language and the development of Western Turkish |
| 6 | The historical development of the Turkish language and the development of Western Turkish |
| 7 | Atatürk's studies and views on the Turkish language |
| 8 | Mid-term exam |
| 9 | Atatürk's studies and views on the Turkish language |
| 10 | Sound information |
| 11 | Sound information |
| 12 | Spelling rules and punctuation |
| 13 | Spelling rules and punctuation |
| 14 | Language policies |
| 15 | Language policies |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Numbers** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 5 | 5 |
| Total Workload (Hours) |  |  | 66 |
| Total Workload (Hours)/30 |  |  | 2,2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311008 | **COURSE NAME** | ANALYSIS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 4 | | 2 | 0 | | 5 | 5 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Introductıon (Real Quantity and complex Quantity, Functions, Graphs,  Trigonometric and inverse trigonometric functions, Limits and continuity)  Derivatives (Derivatives of elementer functions, Derivatives of logaritmic functions, Derivatives of exponentials functions, Derivatives of Hyperbolic functions, Derivatives of Inverse functions, Slope of Curves, Exstreme Values, Asymtots, Graphs of functions, Polar Coordinates and Graphs ın Polar Coordinates. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main of the course is to introduce the concepts and techniques involved in the basic topics listed in this lecture and to develope skills in applying those concepts and techniques to the solution of problems | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Gain the ability of problem solution. | | | | | |
| **COURSE OUTCOMES** | | | | | | Gain sufficient knowledge of Analysis subject, related with science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of problems. | | | | | |
| **TEXTBOOK** | | | | | | Genel matematik-I, Prof Dr. Ali Görgülü | | | | | |
| **OTHER REFERENCES** | | | | | | Analiz-I, Prof. Dr. Mahmut Koçak  Analiz-I Prof Dr.Mustafa Balcı  Genel matematik-I, Prof Dr. H:H:Hacısalihoğlu**;** Prof Dr.Mustafa Balcı | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Basic Properties of Real Quantity | | | | | | | | | | |
| 2 | complex Quantity, Functions, Graphs | | | | | | | | | | |
| 3 | Trigonometric and inverse trigonometric functions | | | | | | | | | | |
| 4 | Logarithmic functions, exponentials functions, Hyperbolic functions | | | | | | | | | | |
| 5 | Midterm Exam 1 | | | | | | | | | | |
| 6 | Limits and Continuity | | | | | | | | | | |
| 7 | Problem solving | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Derivatives of elementary functions, Derivatives of logarithmic functions, Derivatives of exponentials functions | | | | | | | | | | |
| 10 | Derivatives of Hyperbolic functions, Derivatives of Inverse functions | | | | | | | | | | |
| 11 | Midterm Exam 2 | | | | | | | | | | |
| 12 | Applications of the derivative, maximum and minimum values | | | | | | | | | | |
| 13 | Asymptotes,, Graphs of functions | | | | | | | | | | |
| 14 | Polar Coordinates and Graphs ın Polar Coordinates | | | | | | | | | | |
| 15 | Problem solving | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 6 | 84 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 155 |
| Total Workload (Hours)/30 |  |  | 5,16 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311011 | **COURSE NAME** | GARDEN DESIGNING, TREATING AND GREEENHOUSE CULTURE I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 1 | | 0 | 0 | | 0 | 1 | COMPULSORY ( ) ELECTIVE (**X**) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | The history of arrangement of garden and greenhouse culture.  Ecological needs of plants. Important points of the garden arrangement and its maintenance. The maintenance of decorative flowers, matlocking of the soil, fighting against the herbal disorders. Irrigation. Fertilization Equipments for arrangement of garden and greenhouseculture Herbs used in garden arrangement. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The aim of this course, to teach general concept of garden arrangement and Greenhouse techniques, classification of garden types and greenhouse to teach the issues to consider when establishing a greenhouse, to teach detailed information about the history of garden arrangement and greenhouses, internal regulation of gardens and greenhouse and to teach how irrigation should be. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Course will contribute .practical garden arrengement and curation; inner and outer arrengements. to make the students self-confident in works of gardening. To teach conciousness of nature to the students. | | | | | |
| **COURSE OUTCOMES** | | | | | | Learning general concept of garden designing and greenhouse techniques.  Learning historical development process of gardening.  Comprehending the ecological needs of plants.  Comment about the ecological needs of plants.  Comprehending subjects that is paid attention about gardening.  Recognized the plants that are used in gardening. | | | | | |
| **TEXTBOOK** | | | | | | TOKUR, S.,1994. Bitki Yetiştirme Tekniği, T.C. Osmangazi  Ünv.Yayınları No:1 Fen Edebiyat Yayınları No:1 ESKİŞEHİR. | | | | | |
| **OTHER REFERENCES** | | | | | | 1.KONEMANN, 1999. BOTANICA, The Illustrated A-Z of over 10000 garden plants and how to cultivate them. Pg:1020, Random House Australia, ISBN:3-8290-3068-1.  2.TOKUR, S., 2000 T.C. Osmangazi Üniversitesi Fen Edebiyat Fakültesi Bahçe Bakımı ve Seracılık I-II Papers, ESKISEHIR  3.ÜRGENÇ, S., 1992. Ağaç ve Süs Bitkileri, Fidanlık ve Yetiştirme Tekniği, İ.Ü. Basımevi ve Film Merkezi, İSTANBUL. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projection and computer. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | The historical development of gardening. | | | | | | | | | | |
| 2 | Ecological needs of plants(Climatical properties). | | | | | | | | | | |
| 3 | Ecological needs of plants(Soil properties). | | | | | | | | | | |
| 4 | Properties that is necessary for gardening. | | | | | | | | | | |
| 5 | Tools that are used in gardening and greenhouse. | | | | | | | | | | |
| 6 | Mosaic plans and upholstery plants. | | | | | | | | | | |
| 7 | Mosaic plans and upholstery plants. | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Squat, creeping plants. | | | | | | | | | | |
| 10 | Grass plants. | | | | | | | | | | |
| 11 | Grass plants. | | | | | | | | | | |
| 12 | Trees and shrubs. | | | | | | | | | | |
| 13 | Trees and shrubs. | | | | | | | | | | |
| 14 | Stony garden plants. | | | | | | | | | | |
| 15 | Stony garden plants. | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  |  | X |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 1 | 14 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 1 | 1 |
| Final exam and Preparation | 1 | 1 | 1 |
| Total Workload (Hours) |  |  | 30 |
| Total Workload (Hours)/30 |  |  | 1 |
| ECTS Credits of the Course |  |  | 1 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311009 | **COURSE NAME** | PHYSICAL EDUCATION I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 1 | | 0 | 0 | | 0 | 1 | COMPULSORY ( ) ELECTIVE (**X**) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Physical education; running, joint and muscle groups convenient to theirs level, sport branch, basketball, volleyball, handball ,football, field measures and rules of game, sport benefits to our health; health, first aid, matches in class. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The ability of having knowledge concerning the orders of the lecture. The ability of running all the organs and systems to convenience of theirs level.  The ability of improving the nerve muscle and joint coordinating. The ability of having basic knowledge, skill, manner and habits concerning physical education and sport  Take responsibility and duty, to go with leader and the ability of doing leadership  Playing amicably and competition appreciating the winner acceptance of loosing, and can be object to trick and injustice.  Having knowledge about sport, vehicle and facilities and can use this. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | | The ability of growing health, happy, developed aspect of physical and psychological, self confident individuals who have the sense competitioning amicably. | | | | | |
| **TEXTBOOK** | | | | | | Physical Education at Schools (Hikmet Aracı l999) | | | | | |
| **OTHER REFERENCES** | | | | | | Basic principles in Physical Education and Sport (Yrd. Doç. Dr. Faruk Yamaner)2001 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
| **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Giving general knowledge about the subject of physical education. | | | | | | | | | | |
| 2 | Jogging, rotating which is softening joint and muscle groups. Giving knowledge about basic basketball rules, the matters to take care of passing and rubbing ball. | | | | | | | | | | |
| 3 | Jogging, warning movements, defense and offence studies at basketball. | | | | | | | | | | |
| 4 | Jogging, stretching movements, rubbing ball, exit to turnstile studies, attack sets at basketball. | | | | | | | | | | |
| 5 | Atatürk’s words on sport, jogging, passing and playing short-time match in basketball playing rules. | | | | | | | | | | |
| 6 | Jogging, stretching movements, giving basic knowledge about basic volleyball techniques, finger pass on net and control pass studies. | | | | | | | | | | |
| 7 | Interval studying, stretching movements headline at volleyball, pass and service firing, return in field at volleyball. | | | | | | | | | | |
| 8 | Midterm exam | | | | | | | | | | |
| 9 | What’s benefit of sport our health? Stretching movements, doing match in volleyball playing rules. | | | | | | | | | | |
| 10 | Running athletics (short, middle, long) knowledge about distance, warning studying, short-time volleyball match. | | | | | | | | | | |
| 11 | Jogging, stretching movements, giving knowledge about basic handball techniques. | | | | | | | | | | |
| 12 | Jogging, movement for strengthening joint and muscles groups, rubbing ball and pass studies at handball. | | | | | | | | | | |
| 13 | Exercise for stretching and loosening the muscles, football playing rules and passing studies, short-time football match. | | | | | | | | | | |
| 14 | First aid at sport disability, jogging, stretching movements, marches in class. | | | | | | | | | | |
| 15 | Jogging, warning movements, stretching studies, matches in class | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 1 | 14 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 1 | 1 |
| Final exam and Preparation | 1 | 1 | 1 |
| Total Workload (Hours) |  |  | 30 |
| Total Workload (Hours)/30 |  |  | 1 |
| ECTS Credits of the Course |  |  | 1 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311001 | **COURSE NAME** | INTRODUCTION TO PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 2 | | - | - | | | 2 | 2 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | | **Social Science** |
|  | | |  | | | X | | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 50 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | | Presentation | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | | Development of Physical Science, Some important concepts in physics, Scientific research process, concepts of professional and scientific ethics, presentation and report preparation techniques. | | | | | |
| **COURSE OBJECTIVES** | | | | | | | To enable students to learn the development of physical science, some important basic concepts and terms related to the profession, the unit systems that will be required continuously in education and professional life, research processes; to have knowledge and opinions about professional and scientific ethical concepts, to gain the skills to prepare research reports and presentations. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | | | To have knowledge of professional opportunities and ethical issues, to gain experience in the management of scientific research processes and presentation skills. | | | | | |
| **COURSE OUTCOMES** | | | | | | | Evaluates the physical science and its historical development.  Interprets some basic concepts of physics.  Understand the concepts of scientific and professional ethics.  Writes research reports in accordance with the rules.  Recognize the types of presentations (reports, papers, articles, posters)  Understands the basic structure of the scientific research process | | | | | |
| **TEXTBOOK** | | | | | | | Physics 1: Scientists and Engineers, Raymond A. Serway | | | | | |
| **OTHER REFERENCES** | | | | | | | - | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Introduction of the program | | | | | | | | | | | |
| 2 | The Birth of Science: Science from the past to the present | | | | | | | | | | | |
| 3 | Development of physical science | | | | | | | | | | | |
| 4 | Some important concepts in physics: Measurement and fundamental quantities | | | | | | | | | | | |
| 5 | Some important concepts in physics: Vectors and vector operations | | | | | | | | | | | |
| 6 | Physics and Mathematics | | | | | | | | | | | |
| 7 | Scientific Research Process and basic concepts | | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | | |
| 9 | Data analysis and interpretation | | | | | | | | | | | |
| 10 | Source search in Physics | | | | | | | | | | | |
| 11 | Academic presentation techniques | | | | | | | | | | | |
| 12 | Report preparation Technique | | | | | | | | | | | |
| 13 | Ethics of Science | | | | | | | | | | | |
| 14 | Career Planning and Development | | | | | | | | | | | |
| 15 | Vocational Education and Vocational Ethics | | | | | | | | | | | |
| 16,17 | Final exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 62 |
| Total Workload (Hours)/30 |  |  | 2.07 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Prof. Dr. İdris AKYÜZ

**Signature**

**Date:**19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311001 | **COURSE NAME** | PHYSICS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 4 | | 2 | 0 | | 5 | 7 | COMPULSORY **(X** ) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (Ö)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 10 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Measurement and unit systems, vectors, motion along a straight line; motion in two and three dimensions; force and motion I; force and motion II; kinetic energy and work; conservation of energy; center of mass and linear momentum; rotation; rolling, torque and angular momentum; equilibrium | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main object of the course is to provide a basic understanding of Newtonian mechanics and conservation laws. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Apply and link the gained knowledge of natural sciences to interdisciplinary fields. Correlate and apply gained knowledge directly with technology and industry. | | | | | |
| **COURSE OUTCOMES** | | | | | | Identify, formulate, and solve problems analytically that appear in physical systems. Analyze and resolve natural phenomenon. Associate the gained knowledge, analyze and interpret data | | | | | |
| **TEXTBOOK** | | | | | | **Bekir Karaoğlu. (2020).** Üniversiteler için Fizik. Seçkin yayıncılık | | | | | |
| **OTHER REFERENCES** | | | | | | **Halliday, D. , Resnick, R., & Walker, J. (2006) 6th ed.** Fundamentals of Physics. New York: John Wiley & Sons, Inc.  Serway, R.A. (1990). **Physics for Scientists and Engineers.**  **Philadelphia: Saunders College Publishing.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Measurement and unit systems | | | | | | | | | | |
| 2 | Vectors | | | | | | | | | | |
| 3 | Motion in one dimension | | | | | | | | | | |
| 4 | Motion in two and three dimensions | | | | | | | | | | |
| 5 | Newton's laws and their applications | | | | | | | | | | |
| 6 | Work and energy | | | | | | | | | | |
| 7 | Potential energy and conservation of energy | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Impulse and linear momentum | | | | | | | | | | |
| 10 | Collisions and conservation of linear momentum | | | | | | | | | | |
| 11 | Rotational kinematics | | | | | | | | | | |
| 12 | Rotational dynamics | | | | | | | | | | |
| 13 | Moment and angular momentum | | | | | | | | | | |
| 14 | Equilibrium | | | | | | | | | | |
| 15 | Harmonic motion | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | **X** |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | **X** |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | **X** |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | **X** |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | **X** |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | **X** |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | **X** |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | **X** |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | **X** |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | **X** |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 6 | 84 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework | 1 | 12 | 12 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 12 | 12 |
| Final exam and Preparation | 1 | 12 | 12 |
| Total Workload (Hours) |  |  | 204 |
| Total Workload (Hours)/30 |  |  | 6.8 |
| ECTS Credits of the Course |  |  | 7 |

**Instructor(s):** Assoc. Prof. Mustafa AKARSU

**Signature** **Date:**19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821311002 | **COURSE NAME** | PHYSICS LABORATORY I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 1 | | 0 | | 0 | 2 | | 1 | 2 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | | 1 | 40 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Newton’s Laws, elastic spring, viscosity, moment of inertia, collisions. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Learning the basic principles and concepts of physics | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | | To use existing technology and to produce new technologies. | | | | | |
| **COURSE OUTCOMES** | | | | | | To explain natural phenomena and analysis learn the science of physics, Understanding of scientific method and research skills. | | | | | |
| **TEXTBOOK** | | | | | | “Fizik I ve Fizik II Deneyleri Laboratuvar Kitabı”, ARAL E., BİLGİN V., KILIÇ G., İŞSEVER U. G. | | | | | |
| **OTHER REFERENCES** | | | | | | - | | | | | |
| **TOOLS AND equipment REQUIRED** | | | | | | Calculator, graph paper, ruler (others available in Laboratory). | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Measurement | | | | | | | | | | |
| 2 | Newton’s First Law | | | | | | | | | | |
| 3 | Newton’s Second Law | | | | | | | | | | |
| 4 | Newton’s Third Law (A) | | | | | | | | | | |
| 5 | Newton’s Third Law (B) | | | | | | | | | | |
| 6 | Elastic Collision | | | | | | | | | | |
| 7 | Inelastic Collision | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Conversation Of Energy and Kinetic Energy | | | | | | | | | | |
| 10 | [The Mechanical Equivalent of Heat](http://en.wikipedia.org/wiki/James_Joule#The_mechanical_equivalent_of_heat) | | | | | | | | | | |
| 11 | Frictional Torque | | | | | | | | | | |
| 12 | Moment Of Inertia | | | | | | | | | | |
| 13 | Hook’s Law and Elastic Spring | | | | | | | | | | |
| 14 | Viscosity | | | | | | | | | | |
| 15 | Compensation Experiments | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | **X** |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | **X** |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | **X** |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | **X** |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | **X** |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | **X** |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | **X** |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | **X** |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | **X** |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | **X** |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) | 12 | 1 | 12 |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 68 |
| Total Workload (Hours)/30 |  |  | 2.26 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** U. Gökhan İŞSEVER, Ph.D.

**Signature**

**Date:**19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821312010 | **COURSE NAME** | PHYSICAL EDUCATION II |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | 1 | | 0 | 0 | | 0 | 1 | COMPULSORY ( ) ELECTIVE (**X**) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | Physical education; running, joint and muscle groups convenient to theirs level, sport branch, basketball, volleyball, handball field measures and rules of game, sport benefits to our health; health, first aid, matches in class. | | | | | |
| **COURSE OBJECTIVES** | | | | | The ability of having knowledge concerning the orders of the lecture. The ability of running all the organs and systems to convenience of theirs level.  The ability of improving the nerve muscle and joint coordinating. The ability of having basic knowledge, skill, manner and habits concerning physical education and sport  Take responsibility and duty, to go with leader and the ability of doing leadership  Playing amicably and competition appreciating the winner acceptance of losing, and can be object to trick and injustice.  Having knowledge about sport, vehicle, facilities, and can use this. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | The ability of growing health, happy, developed aspect of physical and psychological, self-confident individuals who have the sense competing amicably. | | | | | |
| **TEXTBOOK** | | | | | Physical Education at Schools (Hikmet Aracı l999) | | | | | |
| **OTHER REFERENCES** | | | | | Basic principles in Physical Education and Sport (Yrd. Doç. Dr. Faruk Yamaner)2001 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | |  | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Giving general knowledge about the subject of physical education. |
| 2 | Jogging, rotating which is softening joint and muscle groups. Giving knowledge about basic basketball rules, the matters to take care of passing and rubbing ball. |
| 3 | Jogging, warning movements, defense and offence studies at basketball. |
| 4 | Jogging, stretching movements, rubbing ball, exit to turnstile studies, attack sets at basketball. |
| 5 | Atatürk’s words on sport, jogging, passing and playing short-time match in basketball playing rules. |
| 6 | Jogging, stretching movements, giving basic knowledge about basic volleyball techniques, finger pass on net and control pass studies. |
| 7 | Interval studying, stretching movements headline at volleyball, pass and service firing, return in field at volleyball. |
| 8 | Midterm Exam |
| 9 | What is benefit of sport our health? Stretching movements, doing match in volleyball playing rules. |
| 10 | Running athletics (short, middle, long) knowledge about distance, warning studying, short-time volleyball match. |
| 11 | Jogging, stretching movements, giving knowledge about basic handball techniques. |
| 12 | Jogging, movement for strengthening joint and muscles groups, rubbing ball and pass studies at handball. |
| 13 | Exercise for stretching and loosening the muscles, football playing rules and passing studies, short-time football match. |
| 14 | First aid at sport disability, jogging, stretching movements, marches in class. |
| 15 | Jogging, warning movements, stretching studies, matches in class |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 1 | 14 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 1 | 1 |
| Final exam and Preparation | 1 | 1 | 1 |
| Total Workload (Hours) |  |  | 30 |
| Total Workload (Hours)/30 |  |  | 1 |
| ECTS Credits of the Course |  |  | 1 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821312001 | **COURSE NAME** | PHYSICS II |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 4 | | 2 | 0 | | 5 | 7 | COMPULSORY (X ) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 10 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Electrostatic and Coulomb’s law, Electric Field, Electric Potential, Gauss’s law, Electric current and ohm’s law, Capacitance and dielectrics, Direct-Current Circuits, Magnetic Field and Magnetic  Forces, Biot–Savart law, Faraday's law, Lenz’s law, Maxwell Equations. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main object of the course is to introduce fundamental concepts and principles related to the electricity and magnetism and provide an understanding of these principles with applications from the real world | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Analyze and resolve natural phenomenon. Associate the gained knowledge, analyze and interpret data. | | | | | |
| **COURSE OUTCOMES** | | | | | | Know fundamental concepts and principles related to the electricity and magnetism. Identify, formulate, and solve problems analytically that appear in physical systems. | | | | | |
| **TEXTBOOK** | | | | | | **Bekir Karaoğlu. (2020).** Üniversiteler için Fizik. Seçkin yayıncılık | | | | | |
| **OTHER REFERENCES** | | | | | | **Halliday, D. , Resnick, R., & Walker, J. (2006) 6th ed.** Fundamentals of Physics. New York: John Wiley & Sons, Inc.  **Serway, R.A. (1990).** Physics for Scientists and Engineers.  Philadelphia: Saunders College Publishing. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Electrostatic and Coulomb’s law | | | | | | | | | | |
| 2 | Electric Field | | | | | | | | | | |
| 3 | Charged particle motion in electric field | | | | | | | | | | |
| 4 | Gauss’s law | | | | | | | | | | |
| 5 | Electric potential | | | | | | | | | | |
| 6 | Electric potential energy | | | | | | | | | | |
| 7 | Capacitance and dielectrics | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Electric current and Ohm’s law | | | | | | | | | | |
| 10 | Electric Circuits | | | | | | | | | | |
| 11 | Magnetic field | | | | | | | | | | |
| 12 | Magnetic forces | | | | | | | | | | |
| 13 | Magnetic field sources | | | | | | | | | | |
| 14 | Faraday's law, Lenz’s law | | | | | | | | | | |
| 15 | Maxwell equations | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 6 | 84 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework | 1 | 12 | 12 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 12 | 12 |
| Final exam and Preparation | 1 | 12 | 12 |
| Total Workload (Hours) |  |  | 204 |
| Total Workload (Hours)/30 |  |  | 6.8 |
| ECTS Credits of the Course |  |  | 7 |

**Instructor(s):** Assoc. Prof. Mustafa AKARSU

**Signature**:  **Date:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821312002 | **COURSE NAME** | PHYSICS LABORATORY II |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 0 | | 0 | 2 | | 1 | 2 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | | 1 | 40 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Fundamental concepts of electromagnetism, Electrolysis, Frequency exploration, Ohm’s Law, Wheatstone Bridge, Electromagnetic Induction, RC circuits, Magnetic field due to current carrying conductor, Electrical equivalence of heat. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Teaching the applications of electromagnetism | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | | To enable students to apply what they see theoretically in the Physics II course in the laboratory. | | | | | |
| **COURSE OUTCOMES** | | | | | | The student applies the basic laws and concepts of physics experimentally.  Collects data.  Evaluates and discusses the results. | | | | | |
| **TEXTBOOK** | | | | | | “Fizik I ve Fizik II Deneyleri Laboratuvar Kitabı”, ARAL E., BİLGİN V., KILIÇ G., İŞSEVER U. G. | | | | | |
| **OTHER REFERENCES** | | | | | | - | | | | | |
| **TOOLS AND EQUIPMENT REQUIRED** | | | | | | Calculator, graph paper, ruler (others available in Laboratory). | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Fundamental Concepts of Electromagnetism | | | | | | | | | | |
| 2 | Electrolysis | | | | | | | | | | |
| 3 | Frequency Exploration | | | | | | | | | | |
| 4 | Ohm’s Law | | | | | | | | | | |
| 5 | Wheatstone Bridge | | | | | | | | | | |
| 6 | Electromagnetic Induction I | | | | | | | | | | |
| 7 | Electromagnetic Induction II | | | | | | | | | | |
| 8 | Mid-Term Exam | | | | | | | | | | |
| 9 | RC Circuits I | | | | | | | | | | |
| 10 | RC Circuits II | | | | | | | | | | |
| 11 | Magnetic Field Due to Current Carrying Conductor | | | | | | | | | | |
| 12 | Earth’s Magnetic Field Calculation by Using Current Carrying Conductor | | | | | | | | | | |
| 13 | Electrical Equivalence of Heat | | | | | | | | | | |
| 14 | A Filament’s Yield | | | | | | | | | | |
| 15 | Compensation Experiments | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) | 12 | 1 | 12 |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 68 |
| Total Workload (Hours)/30 |  |  | 2.26 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** U. Gökhan İŞSEVER, Ph.D.

**Signature**:

**Date:**19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821312003 | **COURSE NAME** | PHYSICS and TECHNOLOGY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 2 | | - | - | | 2 | 2 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 50 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Presentation | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Semiconductor technologies, Electron Microscopes, Nanotechnology, x-rays, defense and laser technologies, particle accelerators and imaging technologies. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To introduce the current applications of physics by emphasizing the role and importance of physics and sub-branches of physics in technological applications, to enable them to have information about quantum technologies, semiconductor technologies, optical technologies. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | | To gain awareness about physics and physicist's place in today's technologies and career options. | | | | | |
| **COURSE OUTCOMES** | | | | | | Classifies the equivalents of basic physics concepts in technological applications.  Explain how physics is applied to events in the world.  Recognizes how the methods and principles of physics can help to solve problems in technology. | | | | | |
| **TEXTBOOK** | | | | | | - | | | | | |
| **OTHER REFERENCES** | | | | | | - | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Physics and the role of the physicist in technology | | | | | | | | | | |
| 2 | Semiconductor Technologies | | | | | | | | | | |
| 3 | From Sun to Electricity | | | | | | | | | | |
| 4 | Electron Microscopes | | | | | | | | | | |
| 5 | Nanotechnology | | | | | | | | | | |
| 6 | X-rays and Technological Applications | | | | | | | | | | |
| 7 | Superconductivity | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Physics in Defense&Security Technologies | | | | | | | | | | |
| 10 | Laser Technologies | | | | | | | | | | |
| 11 | Introduction of CERN | | | | | | | | | | |
| 12 | Particle accelerators | | | | | | | | | | |
| 13 | Computer Technologies | | | | | | | | | | |
| 14 | Imaging Technologies | | | | | | | | | | |
| 15 | Optical Device Technologies | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 62 |
| Total Workload (Hours)/30 |  |  | 2.07 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Prof. Dr. İdris AKYÜZ

**Signature**:

**Date:**19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821312009 | **COURSE NAME** | ENGLISH II |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 3 | | 0 | 0 | | 0 | 3 | COMPULSORY (**X**) ELECTIVE ( ) | | English |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Teaching of some structures for basic vocabulary and grammar knowledge | | | | | |
| **COURSE OBJECTIVES** | | | | | | Basis of English for A2 level | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | - | | | | | |
| **COURSE OUTCOMES** | | | | | | Being aware of learning a language and being able to use some basic grammar structures | | | | | |
| **TEXTBOOK** | | | | | | Number One | | | | | |
| **OTHER REFERENCES** | | | | | | Grammar Practice Elementary | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Be going to/Travel and Tourism | | | | | | | | | | |
| 2 | Countable/uncountable nouns | | | | | | | | | | |
| 3 | Comparatives/superlatives | | | | | | | | | | |
| 4 | Present Perfect tense | | | | | | | | | | |
| 5 | Present Perfect tense | | | | | | | | | | |
| 6 | Should/had better/must | | | | | | | | | | |
| 7 | General Review Questions | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Grammar Practice modals | | | | | | | | | | |
| 10 | Grammar Practice prepositions | | | | | | | | | | |
| 11 | Grammar Practice sentence structures | | | | | | | | | | |
| 12 | Grammar Practice simple past/past continuous | | | | | | | | | | |
| 13 | Grammar Practice imperatives | | | | | | | | | | |
| 14 | Grammar Practice imperatives | | | | | | | | | | |
| 15 | General Review Questions | | | | | | | | | | |
| 16,17 | Yarıyıl Sonu Sınavı | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 6 | 6 |
| Final exam and Preparation | 1 | 6 | 6 |
| Total Workload (Hours) |  |  | 96 |
| Total Workload (Hours)/30 |  |  | 3,2 |
| ECTS Credits of the Course |  |  | 3 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **COURSE CODE** | 821312007 | **COURSE NAME** |  | OCCUPATIONAL HEALTH AND SAFETY II |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** | |
| Spring | | | 2 | | - | - | | 2 | 2 | COMPULSORY (X ) ELECTIVE ( ) | | Turkish | |
| **COURSE CATEGORY** | | | | | | | | | | | | | |
| **Basic Science** | | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** | |
| X | | | |  | | | X | | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | | |
| **MID-TERM** | | | | | | | **Evaluation Type** | | | | **Quantity** | **%** | |
| 1st Mid-Term Exam | | | | 1 | 40 | |
| 2nd Mid-Term Exam | | | |  |  | |
| Quiz | | | |  |  | |
| Homework | | | |  |  | |
| Project | | | |  |  | |
| Report | | | |  |  | |
| Others (………) | | | |  |  | |
| **FINAL EXAM** | | | | | | |  | | | | 1 | 60 | |
| **PREREQUISITE(S)** | | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | | Technical terms in the sector, OHS regulations at workplaces, Dust problem and control methods, Occupational diseases; definition, classification, statistical information, causes, treatment and prevention, studies to be done before and after emergencies Risk assessment regulation, risk assessment in the sector, workplace accidents and solutions. | | | | | |  |
| **COURSE OBJECTIVES** | | | | | | | To teach occupational health and safety measures and legal obligations. | | | | | |  |
|  | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | | To protect human health and to ensure safety by knowing precautions against possible accidents and occupational diseases in working life | | | | | |  |
|  | | | | | |
| **COURSE OUTCOMES** | | | | | | | 1.An ability to interpret OHS legislation   1. An ability to identify existing hazards and risks in the workplace. 2. An ability to apply the concept of risk assessment 4. Ability to choose PPE | | | | | |  |
|  | | | | | |
| **TEXTBOOK** | | | | | | | 1.Related laws and regulations  2**.** ŞENGEL G., ERDEM M.S., ÖNDER M., KARABACAKOĞLU.,  **ÜNALDI T.** ve AYTEKİN O., 2016, İş Güvenliği Uzmanlığı Sınavlarına Yönelik Çalışma Notları, Nisan Kitabevi, Eskişehir. | | | | | | |
| **OTHER REFERENCES** | | | | | | | 1. Kahya, E., 2014, **İş Güvenliği**, ESOGÜ Yayın No :246, Eskişehir.  Kahya, E., Özkar, D., 2018, İş Güvenliği, Dorlion Yayınları,Eskişehir, | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | | Computer and projection equipment | | | | | |  |
|  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | | |
| 1 |  | Introduction and overview | | | | | | | | | | |  |
| 2 |  | Ergonomics | | | | | | | | | | |  |
| 3 |  | Ergonomics | | | | | | | | | | |  |
| 4 |  | Emergency plans | | | | | | | | | | |  |
| 5 |  | Protection policies | | | | | | | | | | |  |
| 6 |  | OHS in electrical works | | | | | | | | | | |  |
| 7 |  | Health and Safety Signs | | | | | | | | | | |  |
| 8 |  | Midterm | | | | | | | | | | |  |
| 9 |  | Ethics in working life | | | | | | | | | | |  |
| 10 |  | Risk assessment | | | | | | | | | | |  |
| 11 |  | Risk assessment | | | | | | | | | | |  |
| 12 |  | Accidents at work | | | | | | | | | | |  |
| 13 |  | Accidents at work | | | | | | | | | | |  |
| 14 |  | Accidents at work | | | | | | | | | | |  |
| 15 |  | Accidents at work | | | | | | | | | | |  |
| 16,17 | Final Exam | | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 18 | 1 | 18 |
| Total Workload (Hours) |  |  | 60 |
| Total Workload (Hours)/30 |  |  | 2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Dr. Öğr.Üyesi Tevfik ÜNALDI **Signature**:

**Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821312004 | **COURSE NAME** | CHEMISTRY II |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** | |
| 2 | | 4 | | 0 | 0 | | 4 | 4 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkısh | |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** | |
|  | | |  | | | X | | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** | |
| 1st Mid-Term Exam | | | | 1 | 40 | |
| 2nd Mid-Term Exam | | | |  |  | |
| Quiz | | | |  |  | |
| Homework | | | |  |  | |
| Project | | | |  |  | |
| Report | | | |  |  | |
| Others (………) | | | |  |  | |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 | |
| **PREREQUISITE (S)** | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | Solutions and their physical properties, chemical kinetics; principles of chemical equilibrium; acids and bases; acid-base equilibria; solubility and complex-ion equilibria; thermodynamic; electrochemistry ; metals ; complex compounds;nuclear chemistry; organic chemistry and biochemistry | | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main aim of the course is about knowing fundamental aspects of chemistry. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Ability to apply the knowledge of physics and chemistry | | | | | |  |
|  | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. List factors that affect reaction rates. 2. Calculate a value for equilibrium constant and use it to predict the extent to which the reactions in a chemical reaction are converted to products. | | | | | | |
| **TEXTBOOK** | | | | | | Jones, L. and Atkins, P. (2000). Chemistry, 4th Edition, W.H.Freeman and Company, New York, USA. | | | | | | |
| **OTHER REFERENCES** | | | | | | 1.Petrucci, R., Harwood, W.S. and Herring, F.G. (2002). General Chemistry, 8th Edition, Prentice Hall, USA.  2.Ebbing, D.D., Wentworth, R.A.D. and Birk, J.P. (1995). Introductory Chemistry, Houghton Mifflin Company, USA. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computor and data show | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Chemical Kinetics | | | | | | | | | | | |
| 2 | Principles Of Chemical Equilibrium | | | | | | | | | | | |
| 3 | Acids And Bases | | | | | | | | | | | |
| 4 | Acid-Base Equilibria | | | | | | | | | | | |
| 5 | Solubility And Complex-Ion Equilibria | | | | | | | | | | | |
| 6 | Thermodynamic | | | | | | | | | | | |
| 7 | Electrochemistry | | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | | |
| 9 | Metals | | | | | | | | | | | |
| 10 | Complex Compounds | | | | | | | | | | | |
| 11 | Nuclear Chemistry | | | | | | | | | | | |
| 12 | Organic Chemistry | | | | | | | | | | | |
| 13 | Organic Chemistry | | | | | | | | | | | |
| 14 | Biochemistry | | | | | | | | | | | |
| 15 | Chemical Kinetics | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | | | | |  |
| **ACTIVITIES** | | | **Quantity** | | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | | | 14 | | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | | | 14 | | 4 | 56 |
| Homework | | |  | |  |  |
| Project (including preparation and presentation time, if any) | | |  | |  |  |
| Report (including preparation and presentation time, if any) | | |  | |  |  |
| Presentation (including preparation time) | | |  | |  |  |
| Quiz and preparation (Quiz) | | |  | |  |  |
| Midterm and preparation | | | 1 | | 10 | 10 |
| Final exam and Preparation | | | 1 | | 10 | 10 |
| Total Workload (Hours) | | |  | |  | 132 |
| Total Workload (Hours)/30 | | |  | |  | 4,4 |
| ECTS Credits of the Course | | |  | |  | 4 |
| **COURSE CODE** | 821312005 | **COURSE NAME** | | CHEMISTRY LABORATORY II | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 0 | | 0 | 2 | | 1 | 2 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | | 1 | 50 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 50 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Differentiation by using the properties of the substance, qualitative analysis, simple distillation, solution preparation, pH and indicators, acid-base titration, crystallization, melting, boiling sublimation, determining the solubility of a substance, effect of temperature on solubility | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main aim of the course is to teach students how to carry out experimental work in the laboratory and gain ability to do chemical research related to the subjects taught in the main lecture | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Prepare every kind of solution required in the experiments,know the dangerous effects of chemicals used in the laboratory. | | | | | |
| **COURSE OUTCOMES** | | | | | | Use techniques, skills, and modern tools necessary for practice in chemistry, gain ability on research and learn scientific method, gain ability on teamwork. | | | | | |
| **TEXTBOOK** | | | | | | Genel Kimya Laboratuvar Uygulamaları (ESOGU) | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Genel kimya Laboratuvar Kitabı (2001) Cumhuriyet Üniversitesi Yayınları. 2. Petrucci R.H., Harwood W.S.,Herring F.G. (2005) Genel Kimya   Palme Yayıncılık | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Laboratory eqiuments | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Pre-interwiev of laboratory | | | | | | | | | | |
| 2 | Introduction of laboratory equipments | | | | | | | | | | |
| 3 | The physical properties of matter | | | | | | | | | | |
| 4 | Qualitative analysis Destilation | | | | | | | | | | |
| 5 | Solution preparation | | | | | | | | | | |
| 6 | pH ve indicators | | | | | | | | | | |
| 7 | Titrimetric analysis | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Acid-base titrations Crystal types of molecules | | | | | | | | | | |
| 10 | Acid-base titrations Crystal types of molecules | | | | | | | | | | |
| 11 | Melting, boiling and sublimation of matter | | | | | | | | | | |
| 12 | Determination of solubility of a substance | | | | | | | | | | |
| 13 | The effects of concentration and temperature on the reaction rate | | | | | | | | | | |
| 14 | Solution of matter in different solvents | | | | | | | | | | |
| 15 | Compensation Experiment | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | | | | |  |
| **ACTIVITIES** | | | **Quantity** | | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | | | 14 | | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | | | 14 | | 1 | 14 |
| Homework | | |  | |  |  |
| Project (including preparation and presentation time, if any) | | |  | |  |  |
| Report (including preparation and presentation time, if any) | | | 7 | | 1 | 7 |
| Presentation (including preparation time) | | |  | |  |  |
| Quiz and preparation (Quiz) | | |  | |  |  |
| Midterm and preparation | | |  | |  |  |
| Final exam and Preparation | | | 1 | | 14 | 14 |
| Total Workload (Hours) | | |  | |  | 63 |
| Total Workload (Hours)/30 | | |  | |  | 2.1 |
| ECTS Credits of the Course | | |  | |  | 2 |
| **COURSE CODE** | 821312012 | **COURSE NAME** | | HEALTY EATING II | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 1 | | 0 | 0 | | | 0 | 1 | COMPULSORY ( ) ELECTIVE (**X**) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | |  |  |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | Within the scope of this course; Nutrition principles in weakness and obesity, food groups, food storage, nutrition of pregnant and lactating women, nutrition of infants and children, nutrition in malnutrition and metabolic diseases, nutrition of the elderly, nutrition of workers, nutrition of athletes will be covered. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | Establishing the relationship between health and nutrition, comprehending the importance of nutrients and food groups in terms of adequate and balanced nutrition, teaching energy metabolism, the causes of weakness and obesity and nutrition styles, teaching the importance of food storage, preparation and cooking conditions for health, nutrition according to age groups and common It is aimed to teach nutrition issues in diseases. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | This course will provide the basis for students to be healthy individuals both in the professional field and in their daily lives. | | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. Gains knowledge about nutrients and food groups. 2. Comprehends the properties of nutrients in terms of healthy nutrition, their role in body work, the amounts to be taken daily and their interactions. 3. Gain knowledge about energy metabolism. Understands the basal metabolic rate and the relationship between physical activity and energy metabolism. 4. Knows and comprehends the causes of thinness and obesity and teaching nutrition styles. 5. Knows and comprehends food hygiene, food storage, preparation and cooking conditions for a healthy diet. 6. Gains knowledge about nutrition of pregnant and lactating women. 7. Gain knowledge about the nutrition of babies and children. 8. Knows and comprehends the principles of nutrition in malnutrition and metabolic diseases. 9. Knows and comprehends the nutrition principles of the elderly. 10. Knows and comprehends the principles of nutrition of workers. 11. Knows and comprehends the nutrition principles of athletes. | | | | | | |
| **TEXTBOOK** | | | | | | Eker, H. H, Güneş Bayır, A.. 2015. Healthy Nutrition, Nobel Publications, Istanbul. | | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and projector | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Characteristics of nutrients in terms of healthy nutrition, their role in body work, the amount to be taken daily | | | | | | | | | | | |
| 2 | Characteristics of nutrients in terms of healthy nutrition, their role in body work, the amount to be taken daily | | | | | | | | | | | |
| 3 | Energy metabolism. Basal metabolic rate and the relationship of physical activity with energy metabolism | | | | | | | | | | | |
| 4 | Energy metabolism. Basal metabolic rate and the relationship of physical activity with energy metabolism | | | | | | | | | | | |
| 5 | Causes of weakness and obesity and diet patterns | | | | | | | | | | | |
| 6 | Food hygiene, storage, preparation and cooking conditions for healthy eating | | | | | | | | | | | |
| 7 | Food hygiene, storage, preparation and cooking conditions for healthy eating | | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | | |
| 9 | Nutrition of pregnant and lactating women | | | | | | | | | | | |
| 10 | Feeding babies and children | | | | | | | | | | | |
| 11 | Nutrition in malnutrition and metabolic diseases | | | | | | | | | | | |
| 12 | Nutrition in malnutrition and metabolic diseases | | | | | | | | | | | |
| 13 | Nutrition of the elderly | | | | | | | | | | | |
| 14 | Feeding the workers | | | | | | | | | | | |
| 15 | Nutrition of athletes | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  |  | X |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | | | | |  |
| **ACTIVITIES** | | | **Quantity** | | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | | | 14 | | 1 | 14 |
| Out of Class Study Time (Pre-study, Reinforcement) | | | 14 | | 1 | 14 |
| Homework | | |  | |  |  |
| Project (including preparation and presentation time, if any) | | |  | |  |  |
| Report (including preparation and presentation time, if any) | | |  | |  |  |
| Presentation (including preparation time) | | |  | |  |  |
| Quiz and preparation (Quiz) | | |  | |  |  |
| Midterm and preparation | | | 1 | | 1 | 1 |
| Final exam and Preparation | | | 1 | | 1 | 1 |
| Total Workload (Hours) | | |  | |  | 30 |
| Total Workload (Hours)/30 | | |  | |  | 1 |
| ECTS Credits of the Course | | |  | |  | 1 |
| **COURSE CODE** | 821312008 | **COURSE NAME** | | TURKISH LANGUAGE II | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 2 | | 0 | 0 | | | 0 | 2 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | |  |  |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | Punctuation and Composition (The spelling of capital letters, The writing of quotations. Quantity, The Composition the purpose of composition, method in composition writing, planning, introduction, development and result in composition. Speech features. Expression disorders. Forms of expression The kinds of verbal telling .The kinds of written telling | | | | | | |
| **COURSE OBJECTIVES** | | | | | | Development of Turkish and about the current state of Turkish. İnforming the students and show the richness of Turkish language. Giving awareness of language. Enable them to know and be able to use them in their daily lives of Turkish [characteristics](http://tureng.com/search/characteristic). | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | This course provides to use Turkish in a good way for students in their dailylife. It is provides to students express themselves and their job in a good way. | | | | | | |
| **COURSE OUTCOMES** | | | | | | Comprehend the richness of the Turkish.  Define the rules for Turkish language  Knows phonetic  Applies rules of writing Creates a composition  Uses the Turkish right. | | | | | | |
| **TEXTBOOK** | | | | | | 1. Türk Dili ve Kompozisyon I-II, Gürer Gülsevin-Erdoğan Boz. 2. Üniversiteler için Türk Dili, Muharrem Ergin. | | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Kaplan, M., “Kültür ve Dil”, 8. baskı, ,Dergah Yayınları, İstanbul, 1993. 2. Fuat, M., “Dil Üstüne”, Adam Yayınları, İstanbul, 2001. 3. Ercilasun, A. B., “Başlangıçtan Yirminci Yüzyıla Türk Dili Tarihi”, Akçağ Yayınları, 1. baskı, Ankara, 2004. 4. Aksan, D., “Türkçe’nin Gücü”, Bilgi Yayınevi, 4. baskı, Ankara, 1997. 5. Karamanlıoğlu, A., “Türk Dili”, Degah Yayınları, 3. baskı, İstanbul, 1984. 6. Anday, M. C., “Dilimiz Üstüne Konuşmalar”, YKY, İstanbul, 1996. 7. Karaağaç, G., “Dil Tarih ve İnsan”, Akçağ Yayınevi, Ankara, 2002. 8. Aksan, D., “Dil Şu Büyülü Düzen”, Bilgi Yayınevi, Ankara, 2003. 9. Banarlı, N. S., “Türkçe’nin Sırları”, 18. baskı, Kubbealtı Neşriyatı, İstanbul, 2002 | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | DVD, VCD, projection, computer | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Punctuation | | | | | | | | | | | |
| 2 | Expression disorders | | | | | | | | | | | |
| 3 | Expression disorders | | | | | | | | | | | |
| 4 | Written Expression Data | | | | | | | | | | | |
| 5 | Written Expression Data | | | | | | | | | | | |
| 6 | Types of Written Expression | | | | | | | | | | | |
| 7 | Types of Written Expression | | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | | |
| 9 | Types of Written Expression | | | | | | | | | | | |
| 10 | Varieties of expression | | | | | | | | | | | |
| 11 | Types of Official Correspondence | | | | | | | | | | | |
| 12 | Preparation Techniques of Scientific Articles | | | | | | | | | | | |
| 13 | Verbal Expression | | | | | | | | | | | |
| 14 | Effective Presentation Techniques | | | | | | | | | | | |
| 15 | Punctuation | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | | | | |  |
| **ACTIVITIES** | | | **Quantity** | | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | | | 14 | | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | | | 14 | | 2 | 28 |
| Homework | | |  | |  |  |
| Project (including preparation and presentation time, if any) | | |  | |  |  |
| Report (including preparation and presentation time, if any) | | |  | |  |  |
| Presentation (including preparation time) | | |  | |  |  |
| Quiz and preparation (Quiz) | | |  | |  |  |
| Midterm and preparation | | | 1 | | 5 | 5 |
| Final exam and Preparation | | | 1 | | 5 | 5 |
| Total Workload (Hours) | | |  | |  | 66 |
| Total Workload (Hours)/30 | | |  | |  | 2,2 |
| ECTS Credits of the Course | | |  | |  | 2 |
| **COURSE CODE** | 821312006 | **COURSE NAME** | | ANALYSIS II | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 4 | | 2 | 0 | | 5 | 5 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Indefinite integrals and integration rules, Method of partial integration method, by changing the variable of integration, The special variable displacement, the integration of rational functions, Definite integral and applications (Area calculation, Arc length calculation, Volume calculation, Improper integrals), Sequence and series, Derivative and integral of Vector-valued functions, Vector-valued functions, arc-length and curvature, The differential calculus of multivariable functions, The integral calculus of multivariable functions, Area, Surface area and Volume calculation of multivariable integrals. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main of the course is to introduce the concepts and techniques involved in the basic topics listed in this lecture and to develope skills in applying those concepts and techniques to the solution of problems in Physics Lectures | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Gain the ability of problem solution. | | | | | |
| **COURSE OUTCOMES** | | | | | | Gain sufficient knowledge of Analysis subject, related with science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of problems. | | | | | |
| **TEXTBOOK** | | | | | | Genel matematik-II, Prof Dr. Ali Görgülü | | | | | |
| **OTHER REFERENCES** | | | | | | Analiz-II, Prof. Dr. Mahmut Koçak  Analiz-II Prof Dr.Mustafa Balcı  Genel matematik-I, Prof Dr. H:H:Hacısalihoğlu; Prof Dr.Mustafa Balcı | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Indefinite integrals and integration rules | | | | | | | | | | |
| 2 | Method of partial integration method, by changing the variable of integration | | | | | | | | | | |
| 3 | The special variable displacement, the integration of rational functions | | | | | | | | | | |
| 4 | Definite integral and applications | | | | | | | | | | |
| 5 | Area calculation, Arc length calculation, Volume calculation, Improper integrals | | | | | | | | | | |
| 6 | Sequence and series | | | | | | | | | | |
| 7 | Problem solving | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Derivative and integral of Vector-valued functions | | | | | | | | | | |
| 10 | Vector-valued functions, arc-length and curvature | | | | | | | | | | |
| 11 | Problem solving | | | | | | | | | | |
| 12 | The differential calculus of multivariable functions | | | | | | | | | | |
| 13 | The integral calculus of multivariable functions | | | | | | | | | | |
| 14 | Area, Surface area and Volume calculation of multivariable integrals | | | | | | | | | | |
| 15 | Problem solving | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | | | | |  |
| **ACTIVITIES** | | | **Quantity** | | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | | | 14 | | 6 | 84 |
| Out of Class Study Time (Pre-study, Reinforcement) | | | 14 | | 4 | 56 |
| Homework | | |  | |  |  |
| Project (including preparation and presentation time, if any) | | |  | |  |  |
| Report (including preparation and presentation time, if any) | | |  | |  |  |
| Presentation (including preparation time) | | |  | |  |  |
| Quiz and preparation (Quiz) | | |  | |  |  |
| Midterm and preparation | | | 1 | | 5 | 5 |
| Final exam and Preparation | | | 1 | | 10 | 10 |
| Total Workload (Hours) | | |  | |  | 155 |
| Total Workload (Hours)/30 | | |  | |  | 5,16 |
| ECTS Credits of the Course | | |  | |  | 5 |
| **COURSE CODE** | 821312011 | **COURSE NAME** | | GARDEN DESIGNING, TREATING AND GREEENHOUSE CULTURE II | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 2 | | 1 | | 0 | 0 | | | 0 | 1 | COMPULSORY ( ) ELECTIVE (**X**) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | |  |  |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | The history of arrangement of garden and greenhouse culture. Ecological needs of plants. Important points of the garden arrangement and its maintenance. The maintenance of decorative flowers, mat locking of the soil, fighting against the herbal disorders. Irrigation. Fertilization Equipments for arrangement of garden and greenhouse culture Herbs used in garden arrangement. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | The aim of this course, to teach general concept of garden arrangement and Greenhouse techniques, classification of garden types and greenhouse to teach the issues to consider when establishing a greenhouse, to teach detailed information about the history of garden arrangement and greenhouses, internal regulation of gardens and greenhouse and to teach how irrigation should be. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Course will contribute.Practical garden arrangement and curation; inner and outer arrangements. to make the students self-confident in works of gardening. To teach consciousness of nature to the students. | | | | | | |
| **COURSE OUTCOMES** | | | | | | Learning general concept of garden designing and greenhouse techniques.  Learning historical development process of gardening.  Comprehending the ecological needs of plants.  Comment about the ecological needs of plants.  Comprehending subjects that is paid attention about gardening.  Recognized the plants that are used in gardening. | | | | | | |
| **TEXTBOOK** | | | | | | TOKUR, S.,1994. Bitki Yetiştirme Tekniği, T.C. Osmangazi  Ünv.Yayınları No:1 Fen Edebiyat Yayınları No:1 ESKİŞEHİR. | | | | | | |
| **OTHER REFERENCES** | | | | | | 1.KONEMANN, 1999. BOTANICA, The Illustrated A-Z of over 10000 garden plants and how to cultivate them. Pg:1020, Random House Australia, ISBN:3-8290-3068-1.  2.TOKUR, S., 2000 T.C. Osmangazi Üniversitesi Fen Edebiyat Fakültesi Bahçe Bakımı ve Seracılık I-II Papers, ESKISEHIR  3.ÜRGENÇ, S., 1992. Ağaç ve Süs Bitkileri, Fidanlık ve Yetiştirme Tekniği, İ.Ü. Basımevi ve Film Merkezi, İSTANBUL. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projection and computer. | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Irrigation, Fertilization And Pruning Methods. | | | | | | | | | | | |
| 2 | Irrigation, Fertilization And Pruning Methods. | | | | | | | | | | | |
| 3 | Production Methods İn Plants (Seed Production). | | | | | | | | | | | |
| 4 | Production Methods İn Plants (Vegetative Production). | | | | | | | | | | | |
| 5 | Production Methods İn Plants (Vegetative Production). | | | | | | | | | | | |
| 6 | Confusing And Repotting. | | | | | | | | | | | |
| 7 | Confusing And Repotting. | | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | | |
| 9 | The Main Pests Of Ornamental Plants. | | | | | | | | | | | |
| 10 | Plant Diseases. | | | | | | | | | | | |
| 11 | Plant Diseases. | | | | | | | | | | | |
| 12 | Greenhouse Floriculture | | | | | | | | | | | |
| 13 | Greenhouse Floriculture | | | | | | | | | | | |
| 14 | Greenhouse Cultivation (Low Tunnels) | | | | | | | | | | | |
| 15 | Greenhouse Cultivation (High Tunnels) | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  |  | X |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 1 | 14 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 1 | 1 |
| Final exam and Preparation | 1 | 1 | 1 |
| Total Workload (Hours) |  |  | 30 |
| Total Workload (Hours)/30 |  |  | 1 |
| ECTS Credits of the Course |  |  | 1 |

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313003 | **COURSE NAME** | MATHEMATICAL METHODS IN PHYSICS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 4 | | 0 | 0 | | 4 | 6 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Complex Quantity; matrx and determinants; analytical geometry; vector analysis; gamma and beta functions. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To define the mathematics which is required to express, understand and formulate physics basic concepts. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects | | | | | |
| **COURSE OUTCOMES** | | | | | | Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) | | | | | |
| **TEXTBOOK** | | | | | | Boas, M. L. (1993). Mathematical Methods in the Physical Sciences. New York: John Wiley&Sons. | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Önem, C. (2003). Mühendislik ve Fizikte Matematik Metodlar. İstanbul: Birsen Yay. 2. Karaoğlu, B. (1994). Fizik ve Mühendislikte Matematik Yöntemler. İstanbul: Bilgi Tek Yay. 3. Özemre, A.Y. (1983). Fizikte matematik metodlar. İstanbul: İstanbul Üniversitesi Fen Fakültesi Yayınları. 4. Kreyszig, E. (1994). Advanced Engineering Mathematics. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Complex number; the complex plane, rectangular, exponential and polar forms of complex Quantity, complex conjugate, elementary functions complex Quantity, Euler’s Formula | | | | | | | | | | |
| 2 | Powers and roots of complex Quantity, exponential and trigonometric functions, hyperbolic functions, logarithms, complex powers, inverse trigonometric and hyperbolic functions | | | | | | | | | | |
| 3 | Properties of determinants; matrices, special matrices,; linear equations. | | | | | | | | | | |
| 4 | Eigenvalues and eigenvectors | | | | | | | | | | |
| 5 | Eigenvalues and eigenvectors | | | | | | | | | | |
| 6 | Vectors; vector operations; index notation; triple products | | | | | | | | | | |
| 7 | Analitical geometry; dots; lines and planes | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Differrentiation of vectors; scalar and vectors fields; directional derivative; gradient and applications | | | | | | | | | | |
| 10 | Diverjgence; rotational (curl); laplacian and applications | | | | | | | | | | |
| 11 | Diverjgence; rotational (curl); laplacian and applications | | | | | | | | | | |
| 12 | Line integrals; conservative fields; scalar potential; exact differentials | | | | | | | | | | |
| 13 | Green theorem in the plane; Divergence theorem; Gauss’s law | | | | | | | | | | |
| 14 | Rotational and applications; Stokes’ theorem; Ampere ‘s law | | | | | | | | | | |
| 15 | Factorial function; gamma function and recursion relation; Beta function–error function. | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  |  | X |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 167 |
| Total Workload (Hours)/30 |  |  | 5.57 |
| ECTS Credits of the Course |  |  | 6 |

**Instructor(s):** Doç. Dr. Şadan Korkmaz

**Signature**: **Date:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313006 | **COURSE NAME** | HISTORY OF TURKISH REVOLUTION AND  PRINCIPLES OF KEMAL ATATÜRK: I |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 2 | | 0 | 0 | | | 2 | 2 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | |  |  |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | In terms of history, the foundations of the Turkish Revolution, the historical development of the Turkish revolution, are discussed comparatively on the chronological axis, the concepts of full independence and national sovereignty are examined, and the struggle is transferred to young individuals. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | To help the students to appreciate the hard conditions under which the war of independence, under the leadership of Mustafa Kemal, was fought and how an independent Turkish state was created. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To underline the idea that the national unity based on the principle “peace in the country peace in the world” can only be achieved through political, economic and military progress. | | | | | | |
| **COURSE OUTCOMES** | | | | | | Ability to apply knowledge of social sciences Ability to analyze, evaluate and design data ability to do group work  Ability to lead an interdisciplinary team  Ability to look at life comparatively  Understanding professional and ethical responsibility  Effective written and verbal communication skills  The ability to understand the national and global impact and consequences of data  Ability to comprehend and apply the importance of lifelong learning  Ability to monitor professional current issues  Ability to conduct scientific research independently or under the supervision of a consultant | | | | | | |
| **TEXTBOOK** | | | | | | Gazi Mustafa Kemal Atatürk, Nutuk (Söylev), C. I-II, TTK., Ank., 1986.  İmparatorluktan Ulus Devlete Türk İnkılâp Tarihi, Cemil Öztürk (ed.), Ank., 2011. | | | | | | |
| **OTHER REFERENCES** | | | | | | Niyazi Berkes, Türkiye’de Çağdaşlaşma, İstanbul, 1978.  Enver Ziya Karal, Atatürk ve Devrim (Konferanslar ve Makaleler), TTK., Ankara, 1980.  Enver Ziya Karal, Atatürk’ten Düşünceler, MEB. Yay., Ankara, 1981. Bernard Lewis, Modern Türkiye’nin Doğuşu, Çev.M.Kıratlı, TTK., Ankara, 1970.  Ahmet Mumcu, Tarih Açısından Türk Devriminin Temelleri ve Gelişimi, Ankara, 1976. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | The purpose of teaching Atatürk's Principles and Revolution History course and the concept of Revolution | | | | | | | | | | | |
| 2 | An Overview of the Reasons Preparing the Collapse of the Ottoman Empire and the Turkish Revolution | | | | | | | | | | | |
| 3 | Fragmentation of the Ottoman Empire (Tripoli, Balkan Wars and the First World War) | | | | | | | | | | | |
| 4 | Armistice of Mudros | | | | | | | | | | | |
| 5 | The State of the Country in the Face of the Occupations and the Reaction of Mustafa Kemal Pasha | | | | | | | | | | | |
| 6 | Mustafa Kemal Pasha's Departure to Samsun, The First Step for the National Struggle | | | | | | | | | | | |
| 7 | Organization through Congresses | | | | | | | | | | | |
| 8 | Midterm | | | | | | | | | | | |
| 9 | Kuva-ı Milliye and Misak-ı Milliye | | | | | | | | | | | |
| 10 | Opening of the Turkish Grand National Assembly | | | | | | | | | | | |
| 11 | The Turkish Grand National Assembly's Handling of the War of Independence | | | | | | | | | | | |
| 12 | National Struggle Until Sakarya Victory | | | | | | | | | | | |
| 13 | National Struggle in Education and Culture | | | | | | | | | | | |
| 14 | The Battle of Sakarya and the Great Offensive | | | | | | | | | | | |
| 15 | From Mudanya to Lausanne | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 5 | 5 |
| Total Workload (Hours) |  |  | 66 |
| Total Workload (Hours)/30 |  |  | 2,2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313005 | **COURSE NAME** | COMPUTER APPLIED PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 20 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | History of the computer; operating systems; programming languages; Algorithm and flow diagrams; constants and variables: arithmetic operations; Input/Output statements; Conditional and unconditional jump statements; definition phrases; arithmetic and logical conditions; loops; One-dimensional arrays; multidimensional arrays and examples; Matrices; input/output operations in indexed variables; subprograms; writing a program in a programming language; Introduction and use of GNUPLOT graphic drawing program; Various applications used in physics. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of the course is to give basic programming knowledge. It is also to make any programming language applications in physical problems. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Simulating physical applications in a computer environment  Realizing the solution of physics problems by using computer programs will give the student a different perspective. | | | | | |
| **COURSE OUTCOMES** | | | | | | Understanding Fortran programming and compilation.  Apply knowledge of basic sciences (Mathematics, Physics, Chemistry).  Formulating, solving and programming problems in the relevant branch.  Ability to analyze, evaluate, experiment and design data.  Modeling and analyzing basic science problems using modern methods and new technologies such as computers and computer software. Associating and applying acquired knowledge with technology and industry. Ability to relate and apply knowledge between disciplines | | | | | |
| **TEXTBOOK** | | | | | | - | | | | | |
| **OTHER REFERENCES** | | | | | | 1. DeVries P. L. (1994). A First Course in Computational Physics. New York: John Wiley & Sons Inc.  Altaç, Z. & Gürkan, İ. (1995). Mühendisler için Fortran Proglamlama.  Eskişehir: ESOGÜ Yayınları. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projector and computer | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | History of the computer; operating systems; programming languages | | | | | | | | | | |
| 2 | Algorithm and flowcharts | | | | | | | | | | |
| 3 | Constants and variables; arithmetic operations | | | | | | | | | | |
| 4 | Input/Output statements; Conditional and unconditional jump statements | | | | | | | | | | |
| 5 | Arithmetic and Logical conditions | | | | | | | | | | |
| 6 | Definition statements | | | | | | | | | | |
| 7 | Loops ; one dimensional arrays | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Multidimensional arrays and examples | | | | | | | | | | |
| 10 | Matrices; Input/Output operations on indexed variables | | | | | | | | | | |
| 11 | Subprograms | | | | | | | | | | |
| 12 | Introduction to GNUPLOT graphic drawing program | | | | | | | | | | |
| 13 | GNUPLOT graphic drawing program applications | | | | | | | | | | |
| 14 | Introduction to various programs used in Physics (MatLab, Origin, etc.) | | | | | | | | | | |
| 15 | Various applications in physics | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 4 | 48 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 17 | 17 |
| Final exam and Preparation | 1 | 22 | 22 |
| Total Workload (Hours) |  |  | 139 |
| Total Workload (Hours)/30 |  |  | 4.63 |
| ECTS Credits of the Course |  |  | 5 |

**Dersin Öğretim Üyesi:** Murat KELLEGÖZ, Ph.D.

**İmza**: **Tarih:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313001 | **COURSE NAME** | WAVES AND OPTICS |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | 4 | | 0 | 0 | | 4 | 6 | COMPULSORY (X ) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 50 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | There are no prerequisites for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | Periodic motions. Young module. Wave equation; standing and progressive waves, phase and groups velocities, dispersion, energy and momentum in wave propagation, Spherical and plane waves. Concept of light, laws of reflection and refraction, complete reflection and Huygens principle. Mirrors and lenses. Wave optics, Young's experiment, interference, diffraction. Polarization of Light. Michelson interferometer | | | | | |
| **COURSE OBJECTIVES** | | | | | Basic objective of the course is the examination of vibrational and wave motion that every physical system possesses and examining the properties of wave motion and studying vibrational and wave motions of some physical systems in detail. In addition, explaining the theories related to light and explaining the phenomena belonging to optical, physical optics. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Examining physical systems in detail and analytical approach, being able to explain and analysis natural phenomena, being able to associate achieved knowledge. | | | | | |
| **COURSE OUTCOMES** | | | | | Interpreting natural phenomena with a different point of view. Performing mathematical expression of periodical motion. Learning the wave concept and forming wave functions of vibrational motion. Recognizing light theories and implementing optical laws to professional events | | | | | |
| **TEXTBOOK** | | | | | Gökhan Budak ve Yüksel Özdemir (2011) Titreşim ve Dalgalar  Önder Orhun, Kudret Özdaş, (1986) Uygulamalı temel fizik (Optik ve Modern Fizik), Anadolu üniversitesi | | | | | |
| **OTHER REFERENCES** | | | | | French, A. P. (Çeviri: Nazım Uçar / 2004). Titreşimler ve Dalgalar. İstanbul: Aktif Yayınevi  Crawford F. S. (Çeviri: Rauf Nasuhoğlu / 1982). Titreşimler ve Dalgalar (Berkeley Fizik Dizisi–3). Güven Yayıncılık.  French, A. P. (1971). Vibrations and Waves. New York: W. W. Norton  & CO, Eugene Hecht, (2019) Optics 5th Ed., Pearson Education | | | | | |

|  |  |
| --- | --- |
| **TOOLS AND EQUIPMENTS REQUIRED** |  |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Periodical motion; Sinusoidal vibrations |
| 2 | Simple harmonic motion, complex exponential definition of vibrations |
| 3 | Free vibrations of physical systems; Mass-spring problem, simple pendulum, torsion pendulum, elasticity and Young modulus |
| 4 | Damped vibrational motion |
| 5 | Forced vibrational motion and resonance |
| 6 | Wave equation; standing waves |
| 7 | Progressive waves, Phase and group velocity, dispersion, Energy and momentum in wave propagation |
| 8 | Mid-term exam |
| 9 | Definition and theories of light |
| 10 | Global and plane waves, laws of reflection and refraction, total reflection and Huygens principle |
| 11 | Plane mirror, spherical mirrors |
| 12 | Plane, spherical, refractive surfaces and thin lenses |
| 13 | Wave optics, Young experiment, interference in thin films, diffraction |
| 14 | Polarization of light |
| 15 | Michelson interferometry |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 5 | 70 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 30 | 30 |
| Final exam and Preparation | 1 | 40 | 40 |
| Total Workload (Hours) |  |  | 182 |
| Total Workload (Hours)/30 |  |  | 6.06 |
| ECTS Credits of the Course |  |  | 6 |

**Instructor(s):** Assoc. Prof. Gökhan KILIÇ

**Signature**: **Date:**19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313002 | **COURSE NAME** | WAVES AND OPTİCS LABORATORY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 0 | | 0 | 2 | | 1 | 2 | COMPULSORY ( X ) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | - | - |
| 2nd Mid-Term Exam | | | | - | - |
| Quiz | | | | - | - |
| Homework | | | | - | - |
| Project | | | | - | - |
| Report | | | | 1 | 50 |
| Others (………) | | | | - | - |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | There is no prerequisite or co-requisite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Simple pendulum, Spiral springs, Torsion pendulum, Weakly damped harmonic motion, Critically damped harmonic motion, Weakly damped forced harmonic motion, Measuring the propagation speed of sound in air, Reflection, refraction, dispersion of light, Mirrors, Lenses, Light prism, Diffraction grating, Polarization and Brewster angle, Polarimeter | | | | | |
| **COURSE OBJECTIVES** | | | | | | Parallel to the waves and optics theoretical course, the main objective of the course is to examine the vibration and wave motion properties of every physical system and to experimentally study the vibration and wave motions of some physical systems. In addition, to prove the theories about light with experiments and to gain the ability to interpret geometric optics and physical optics by examining events. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Detailed analysis of physical systems and analytical approach, To be able to explain and analyze natural events, To relate the gained knowledge. | | | | | |
| **COURSE OUTCOMES** | | | | | | To be able to interpret natural events with experimental methods from a different perspective.  To be able to explain periodic motions, the concept of waves and all events related to light experimentally as well as theoretical expressions and apply them to professional issues. | | | | | |
| **TEXTBOOK** | | | | | | Waves and Optics experiments laboratory booklet | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Gökhan Budak ve Yüksel Özdemir (2011) Titreşim ve Dalgalar      1. Önder Orhun, Kudret Özdaş, (1986) Uygulamalı temel fizik (Optik ve Modern Fizik), Anadolu üniversitesi | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Waves and optics experiment sets | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Introduction, occupational safety training, basic concepts, graphing and interpretation | | | | | | | | | | |
| 2 | Simple pendulum | | | | | | | | | | |
| 3 | Spiral springs | | | | | | | | | | |
| 4 | Torsion pendulum | | | | | | | | | | |
| 5 | Weakly damped harmonic motion, Critically damped harmonic motion | | | | | | | | | | |
| 6 | Weakly damped forced harmonic motion | | | | | | | | | | |
| 7 | Measuring the speed of propagation of sound in air | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Reflection, refraction and dispersion of light | | | | | | | | | | |
| 10 | Mirrors | | | | | | | | | | |
| 11 | Lenses | | | | | | | | | | |
| 12 | Light prism | | | | | | | | | | |
| 13 | Diffraction grating | | | | | | | | | | |
| 14 | Polarization and Brewster’s angle | | | | | | | | | | |
| 15 | Polarimeter | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  |  | X |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 13 | 1 | 13 |
| Homework | - | - | - |
| Project (including preparation and presentation time, if any) | - | - | - |
| Report (including preparation and presentation time, if any) | 13 | 1 | 13 |
| Presentation (including preparation time) | - | - | - |
| Quiz and preparation (Quiz) | - | - | - |
| Midterm and preparation | - | - | - |
| Final exam and Preparation | 1 | 4 | 4 |
| Total Workload (Hours) |  |  | 58 |
| Total Workload (Hours)/30 |  |  | 1.93 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Erkan İLİK, Ph.D.

**Signature**: **Date:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313004 | **COURSE NAME** | DIFFERENTIAL EQUATIONS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | First Order Differential Equations and Applications, Higher Order Linear Differential Equations | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of this course, students gain skills necessary to solve the differential equations | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Enhance the horizons of Mathematics | | | | | |
| **COURSE OUTCOMES** | | | | | | 1 Using the science of physical infrastructure of the differential equation.   1. Analysis to explain natural phenomena. 2. To define related problems, formulate and solve. 3. Understanding of scientific methods and research skills. 4. Information interdisciplinary association and application. 5. Understand professional and ethical responsibility. 6. Understand the importance of lifelong learning and practice. 7. Courses with a relevant professional qualification and knowledge of contemporary issues of ownership. | | | | | |
| **TEXTBOOK** | | | | | | Özer, N. ve, Eser, D. “Diferensiyel Denklemler”, Eskişehir 2002. | | | | | |
| **OTHER REFERENCES** | | | | | | Zill, D. G., Differential equations with boundary-value problems. USA: PWS, 1986. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Differential Equations and their solutions | | | | | | | | | | |
| 2 | Differential Equations and their solutions | | | | | | | | | | |
| 3 | Differential Equations and their solutions | | | | | | | | | | |
| 4 | Differential Equations and their solutions | | | | | | | | | | |
| 5 | Differential Equations and their solutions | | | | | | | | | | |
| 6 | First-order differential equations and their applications | | | | | | | | | | |
| 7 | First-order differential equations and their applications | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | First-order differential equations and their applications | | | | | | | | | | |
| 10 | First-order differential equations and their applications | | | | | | | | | | |
| 11 | Solutions of higher order linear differential equations | | | | | | | | | | |
| 12 | Solutions of higher order linear differential equations | | | | | | | | | | |
| 13 | Solutions of higher order linear differential equations | | | | | | | | | | |
| 14 | Solutions of higher order linear differential equations | | | | | | | | | | |
| 15 | Solutions of higher order linear differential equations | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 20 | 20 |
| Total Workload (Hours) |  |  | 128 |
| Total Workload (Hours)/30 |  |  | 4,27 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313009 | **COURSE NAME** | MEASUREMENT SCIENCE |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE (x) | | Türkçe |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
| Physics | | |  | | |  | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Introduction to measurement science, Purpose and importance of metrology, Measurement science terms and concepts, Physical quantities (quantities) and their units, International unit of measurement and international system of units (SI) metrology system,Terminology of measurement and measurements, Introduction to the measuring device  and the characteristics of measuring devices, Introduction to measurement standards,Introduction to measurement fields | | | | | |
| **COURSE OBJECTIVES** | | | | | | To provide professional knowledge, to train to be able to work in industry, calibration and research laboratories | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To create the infrastructure for them to take part in industrial organizations related to measurement science (calibration, traceability, etc.).  To reach the potential with a detailed study of the field professionally. | | | | | |
| **COURSE OUTCOMES** | | | | | | Knows the purpose and importance of measurement science.  Knows physical sizes.  Knows the measurement standards.  Knows the structure of general measurement science laboratories. | | | | | |
| **TEXTBOOK** | | | | | | Metroloji ve Fizik (Prof. Dr. Naci EKEM) | | | | | |
| **OTHER REFERENCES** | | | | | | - | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Introduction to measurement science | | | | | | | | | | |
| 2 | Purpose and importance of metrology | | | | | | | | | | |
| 3 | Measurement science terms and concepts | | | | | | | | | | |
| 4 | Physical quantities (quantities) and their units | | | | | | | | | | |
| 5 | Physical quantities (quantities) and their units, international metrology system | | | | | | | | | | |
| 6 | Physical quantities (quantities) and their units, international metrology system | | | | | | | | | | |
| 7 | international metrology system | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Units of measurement and the SI unit system | | | | | | | | | | |
| 10 | Terminology of measurement and measurements | | | | | | | | | | |
| 11 | Terminology of measuring devices | | | | | | | | | | |
| 12 | Introduction to the characteristics of measuring devices | | | | | | | | | | |
| 13 | Introduction to measurement standards | | | | | | | | | | |
| 14 | Introduction to measurement field | | | | | | | | | | |
| 15 | Measurement science laboratories, General applications | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 6 | 5 | 30 |
| Homework | 1 | 3 | 3 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 3 | 3 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 3 | 3 |
| Final exam and Preparation | 1 | 3 | 3 |
| Total Workload (Hours) |  |  | 67 |
| Total Workload (Hours)/30 |  |  | 2.25 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Dr. Öğr. Üyesi Sema KURTARAN

**Signature**: **Date:**19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313010 | **COURSE NAME** | ALGORITHM |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 2 | | 0 | 0 | | | 2 | 2 | COMPULSORY ( ) ELECTIVE ( X ) | | English |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 20 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | | 1 | 30 |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | Importance of algorithm in programming, algorithm design techniques, algorithm flow diagrams. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | In this course; It is aimed to gain knowledge and skills in understanding the algorithm logic related to the solution of the problem, showing the algorithm structures with flow charts, learning the use of the programming environment in which the created algorithm will be written and the rules of writing the code, understanding the structure of variables, control statements and loops, learning the logic of the arrays and subprograms. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | It will develop the ability to simulate and solve physical applications in computer environment. | | | | | | |
| **COURSE OUTCOMES** | | | | | | Ability to solve a physical problem with computer aid, Ability to develop computer software for specific problems,  To be able to comprehend the logic of software used in physics. | | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | | |
| **OTHER REFERENCES** | | | | | | C İle Programlama, Harvey M. Deitel - Paul J. Deitel, Çevirmen: Cemil Öz, Palme Yayıncılık, ISBN: 9786053556237, Sayfa Sayısı: 947, Dili: Türkçe,  2017. Algoritma ve Programlama Mantığı, H. Burak Tungut, Kodlab Yayın, ISBN: 9786055201241, Sayfa Sayısı: 320, Dili: Türkçe, 2019. C ile  Algoritma Geliştirme, Feyzullah Temurtaş - Cemil Öz - Özgür Çiftçi, Pusula Yayıncılık ve İletişim, ISBN: 9786055106164, Sayfa Sayısı: 315, Dili: Türkçe, 2014. Algoritma Geliştirme ve Veri Yapıları, Bülent Çobanoğlu, Pusula Yayıncılık ve İletişim, ISBN: 9789756477878, Sayfa Sayısı: 262, Dili: Türkçe, 2014. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and projector. | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Importance of algorithm in programming | | | | | | | | | | | |
| 2 | Algorithm design techniques | | | | | | | | | | | |
| 3 | Flowcharts | | | | | | | | | | | |
| 4 | Visualization of algorithms and flowcharts | | | | | | | | | | | |
| 5 | I/O concepts | | | | | | | | | | | |
| 6 | Algorithm and flowchart applications | | | | | | | | | | | |
| 7 | Algorithm and flowchart applications | | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | | |
| 9 | Data types | | | | | | | | | | | |
| 10 | Constants, variables, operators | | | | | | | | | | | |
| 11 | Loops and functions | | | | | | | | | | | |
| 12 | Algorithm applications with loops and functions | | | | | | | | | | | |
| 13 | Solving a problem with more than one algorithm | | | | | | | | | | | |
| 14 | Searching and sorting algorithms | | | | | | | | | | | |
| 15 | Algorithm homework solutions | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws, and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 1 | 14 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework | 1 | 20 | 20 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 6 | 6 |
| Final exam and Preparation | 1 | 6 | 6 |
| **Total Workload (Hours)** |  |  | 60 |
| **Total Workload (Hours)/30** |  |  | 2 |
| **ECTS Credits of the Course** |  |  | 2 |

**Instructor(s):** Celal AŞICI, PhD **Date:** 19.08.2022

**Signature:**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313007 | **COURSE NAME** | HISTORY OF SCIENCE IN PHYSICS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE (X) | |  |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | 1. In ancient civilizations Science; in Egypt and Mesopotamia science, in the ancient Greeks science, in the Romans science, 2. Medieval Europe and in the Islamic World Science; the medieval view of science, in the Islamic world science, 3. Renaissance and Modern Science; studies in astronomy, developments in the natural sciences, Galileo Galilei, Isaac Newton, theories of light, 4. Science in the age of Enlightenment; in the 18th century natural sciences 4. Euler, Lagrange, Laplace, d'Alembert, C. A. Coulomb, J. L. Lagrange,   J.  Watt, L. Galvani   1. The industrial revolution and science; in the 19th century natural sciences | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of this course, as the periodic phases of science philosophy of science, and cultural structure that period by evaluating the time, scientists have reached includes examining how scientific findings. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Giving students a sense of wonder of science with the transfer of development from yesterday to today. | | | | | |
| **COURSE OUTCOMES** | | | | | | Philosophical approach to the historical development of physics and natural sciences, Taking in conjunction with scientists learn more about the conditions of their day, Being motivated by love of science and scientific work. | | | | | |
| **TEXTBOOK** | | | | | | Cemal Yıldırım. (1997). Bilim Tarihi. İstanbul: Remzi Kitapevi | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Sevim Tekeli, Esin Kaya, Remzi Demir, H. Gazi Tepdemir, Yavuz Unat. (1997). Bilim Tarihi. İstanbul: Doruk Yayınları 2. A. O. Gürel (2001). Doğa Bilimleri Tarihi. Ankara: İmge Kitapevi 3. Cemal Yıldırım. (1996). Bilimin Öncüleri. Ankara: Tübitak Yayınları 4. Infeld, L. (Çeviri: Cemal Yıldırım / 1999). Albert Einstein/Bilimsel Kişiliği ve Dünyamıza Etkisi. İstanbul: Bilgi Yayınevi | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Introduction to Ancient Civilizations | | | | | | | | | | |
| 2 | In the Egypt and Mesopotamia science, in the ancient Greeks science,in the Romans science | | | | | | | | | | |
| 3 | Introduction to Medieval Europe and Islamic World | | | | | | | | | | |
| 4 | During the medieval view of science, in the Islamic world science | | | | | | | | | | |
| 5 | During the medieval view of science, in the Islamic world science | | | | | | | | | | |
| 6 | Introduction to the Renaissance and Modern | | | | | | | | | | |
| 7 | Astronomy studies, developments in the natural sciences | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Wave mechanics, X-Rays and the Bragg diffraction, Compton Effect | | | | | | | | | | |
| 10 | Galileo Galilei, Isaac Newton, Theories of Light | | | | | | | | | | |
| 11 | Galileo Galilei, Isaac Newton, Theories of Light | | | | | | | | | | |
| 12 | Introduction to the science of the Enlightenment era | | | | | | | | | | |
| 13 | In the 18th century natural sciences | | | | | | | | | | |
| 14 | Euler, Lagrange, Laplace, d'Alembert, C. A. Coulomb, J. L. Lagrange, J. Watt, L. Galvani | | | | | | | | | | |
| 15 | The industrial revolution and science; in the 19th century natural sciences | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework | 1 | 2 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 5 | 10 |
| Total Workload (Hours) |  |  | 62 |
| Total Workload (Hours)/30 |  |  | 2.07 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Doç. Dr. Şadan Korkmaz

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313008 | **COURSE NAME** | GEOPHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE (X) | | English |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Introduction to geophysics, physical properties of the earth, development of the geophysics in Turkey, Gravimetry, Gravity,  Newton’s law, determination of gravity, jeostazi, Magnetism, Coulomb’s law, seismographs, the methods of electric and magnetic, earthquakes. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Learn the science and application of geophysical | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | | Understanding between the application fields of physics and geophysics | | | | | |
| **TEXTBOOK** | | | | | | Garland, (1979), Introduction to Geophysics Newyork: Saunders | | | | | |
| **OTHER REFERENCES** | | | | | | Howell,(1978), Introduction to Geophysics, Londra: Kreiger | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Introduction to geophysics | | | | | | | | | | |
| 2 | Physical properties of the earth | | | | | | | | | | |
| 3 | Fundamental structure of the Earth | | | | | | | | | | |
| 4 | Magma and Earth's Magnetic Field Source | | | | | | | | | | |
| 5 | Mines and matter | | | | | | | | | | |
| 6 | Fundamental Physical Formations of the Earth | | | | | | | | | | |
| 7 | Fundamental Physical Formations of the Earth | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Fundamental Physical Formations of the Earth | | | | | | | | | | |
| 10 | Gravimetry, Gravity | | | | | | | | | | |
| 11 | Jeostazi, | | | | | | | | | | |
| 12 | Gravity and Euripus | | | | | | | | | | |
| 13 | Seismographs | | | | | | | | | | |
| 14 | The methods of electric and magnetic | | | | | | | | | | |
| 15 | Earth-Atmosphere | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework | 1 | 5 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) | 31 | 28 | 67 |
| Total Workload (Hours)/30 |  |  | 2.2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Prof. Dr. Tamer AKAN

**Signature**:  **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313011 | **COURSE NAME** | POPULAR PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 2 | | 0 | 0 | | 2 | 3 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Physics related devices and funfamental physics laws | | | | | |
| **COURSE OBJECTIVES** | | | | | | Physics related devices and topics of popular physics. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Analytical thinking and comparison of the their research fields. | | | | | |
| **COURSE OUTCOMES** | | | | | | Application of knowledge of natural sciences (Mathematics, Physics, Chemistry). Identify, formulate, and solve field related problems. Design and conduct experiments as well as to analyze and interpret data. Interdisciplinary knowledge association and application. Direct correlation and application of gained knowledge with technology and industry. Get a recognition of the need for, and an ability to engage in life-long learning. Gain a knowledge of contemporary issues | | | | | |
| **TEXTBOOK** | | | | | | Lecture notes. | | | | | |
| **OTHER REFERENCES** | | | | | | Halliday, D. & Resnick, R. (2002). Çeviri Editörü: Yalçın, C. Fiziğin Temelleri. Ankara: Arkadaş Yayınevi.  Serway, R.A. (1990). Çeviri Editörü: Çolakoğlu, K. Fen ve  Mühendislik için Fizik. Ankara: Palme Yayıncılık. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Matter and structure | | | | | | | | | | |
| 2 | Matter and atom | | | | | | | | | | |
| 3 | 4th state of matter | | | | | | | | | | |
| 4 | Space | | | | | | | | | | |
| 5 | Big bang to nowadays | | | | | | | | | | |
| 6 | About CERN and CERN experiments | | | | | | | | | | |
| 7 | Nuclear enregy | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Nanotechnology | | | | | | | | | | |
| 10 | Nanotechnology | | | | | | | | | | |
| 11 | Sensors | | | | | | | | | | |
| 12 | Sensors | | | | | | | | | | |
| 13 | Metamaterials | | | | | | | | | | |
| 14 | Physics related devices | | | | | | | | | | |
| 15 | Physics related devices | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework | 1 | 5 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 57 |
| Total Workload (Hours)/30 |  |  | 2.53 |
| ECTS Credits of the Course |  |  | 3 |

**Dersin Öğretim Üyesi:** Prof. Dr. Suat PAT

**İmza**: **Tarih:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821313012 | **COURSE NAME** | THE BIRTH OF MODERN PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 3 | | 2 | | 0 | 0 | | 2 | 3 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)**  **]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 50 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | There is no prerequieite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Historical development of physics and the transition from classical physics to modern physics. General relativity, discontinuity in the energy, historical modeling of the atom, known and unknown states of matter, big bang theory, dark matter and dark energy, nuclear energy, general relativity and space-time curvature, Schrödinger’s cat and examination of historical events of all interesting events in the development process of modern physics | | | | | |
| **COURSE OBJECTIVES** | | | | | | To introduce the development of post-classical physics and its impact on the world of science, mainly to students outside of physics education. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Comparison of analytical thinking and basic science research areas | | | | | |
| **COURSE OUTCOMES** | | | | | | To learn the basic principles and concepts of modern physics.  The ability to apply the concepts of contemporary physics to basic sciences such as Biology and Chemistry.  To gain ability to explain and analyze natural phenomena in physical terms.  To gain ability to interpret basic concepts rather than details.  To gain ability to relate and apply knowledge between disciplines.  To gain ability to monitor professional current issues. | | | | | |
| **TEXTBOOK** | | | | | | Lecture notes. | | | | | |
| **OTHER REFERENCES** | | | | | | Halliday, D. & Resnick, R. (2002). Çeviri Editörü: Yalçın, C. Fiziğin Temelleri. Ankara: Arkadaş Yayınevi.  Serway, R.A. (1990). Çeviri Editörü: Çolakoğlu, K. Fen ve Mühendislik için Fizik. Ankara: Palme Yayıncılık. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Physics from Ancient Greece to the Present-1 | | | | | | | | | | |
| 2 | Physics from Ancient Greece to the Present-2 | | | | | | | | | | |
| 3 | Development in physics after Planck | | | | | | | | | | |
| 4 | Development in physics after Planck | | | | | | | | | | |
| 5 | Einstein: General Relativity | | | | | | | | | | |
| 6 | What is light? (Photon theory and ve quantization of energy) | | | | | | | | | | |
| 7 | What is an atom? (Atom models- A historical development) | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | States of matter | | | | | | | | | | |
| 10 | Big Bang theory | | | | | | | | | | |
| 11 | Dark matter and dark energy | | | | | | | | | | |
| 12 | Radioactivity and Nuclear energy | | | | | | | | | | |
| 13 | A Picture of blackhole: General Relativity and space-time curvature | | | | | | | | | | |
| 14 | Schrodinger's cat | | | | | | | | | | |
| 15 | Future of Physics | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 76 |
| Total Workload (Hours)/30 |  |  | 2.53 |
| ECTS Credits of the Course |  |  | 3 |

**Dersin Öğretim Üyesi:** Assoc. Prof. Dr. Gökhan KILIÇ

**İmza**:  **Tarih:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314002 | **COURSE NAME** | MODERN PHYSICS LABORATORY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 0 | | 0 | 2 | | 1 | 2 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
| X | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | | 1 | 40 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Photoelectric Effect, Photovoltaic Effect, Geissler Tubes, e/m  Determination, Geissler Tube, Millikan oil drop experiment, Electron Diffraction Experiment, electron absorption experiment | | | | | |
| **COURSE OBJECTIVES** | | | | | | To teach photoelectric, photovoltaic, discharge of low pressure gases, deflection of electrons in electric and magnetic fields, calculation of electron's eigen charge, measurement of radiation absorption coefficient. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Experiments are designed to teach laboratory and experimental work. | | | | | |
| **COURSE OUTCOMES** | | | | | | Apply knowledge of natural sciences (Mathematics, Physics, Chemistry)  Identify, formulate, and solve field related problems  Design and conduct experiments as well as to analyze and interpret data  Interdisciplinary knowledge association and application  Direct correlation and application of gained knowledge with technology and industry  Get a recognition of the need for, and an ability to engage in life-long learning  Gain a knowledge of contemporary issues | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | | TAYLOR, John J., ZAFIRATOS, Chris D., DUBSON, Michael A.;(2004) Modern Physics.  KRANE, Kenneth; (1982) Modern Physics. John Wiley and Sons  SERWAY, Raymond A. ;(1990) Physics. For Scientists and Engineers | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Experiments in laboratory study and safety | | | | | | | | | | |
| 2 | Introduction to laboratory tools and equipment | | | | | | | | | | |
| 3 | e/m ratio | | | | | | | | | | |
| 4 | Millikan’s oil drop experiment | | | | | | | | | | |
| 5 | Electron diffraction experiment | | | | | | | | | | |
| 6 | Photoelectric Effect | | | | | | | | | | |
| 7 | Geissler Tubes | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Frank-Hertz experiment | | | | | | | | | | |
| 10 | Davisson-Germer experiment | | | | | | | | | | |
| 11 | Atomic spectrums | | | | | | | | | | |
| 12 | Zeeman effect | | | | | | | | | | |
| 13 | Wilson’s cloud chamber | | | | | | | | | | |
| 14 | Absorption of β-Decay Electrons Experiment | | | | | | | | | | |
| 15 | Compensation week | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 10 | 1 | 10 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) | 10 | 2 | 20 |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 4 | 4 |
| Final exam and Preparation | 1 | 4 | 4 |
| Total Workload (Hours) |  |  | 66 |
| Total Workload (Hours)/30 |  |  | 2,2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Celal AŞICI, Ph.D.

**Signature**: **Date:**19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314007 | **COURSE NAME** | HISTORY OF TURKISH REVOLUTION AND  PRINCIPLES OF KEMAL ATATÜRK: II |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | It examines the foundations of the Turkish Revolution in terms of history, the historical development of the Turkish revolution, and the concepts of full independence and national sovereignty, and the struggle is transferred to young individuals. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To help the students to appreciate the hard conditions under which the war of independence, under the leadership of Mustafa Kemal, was fought and how an independent Turkish state was created. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To underline the idea that the national unity based on the principle “peace in the country peace in the world” can only be achieved through political, economic and military progress. | | | | | |
| **COURSE OUTCOMES** | | | | | | Ability to apply knowledge of social sciences  Ability to analyze, evaluate and design data  Ability to lead an interdisciplinary team  Ability to look at life comparatively, understand professional and ethical responsibility, effective written and verbal communication skills  The ability to understand the national and global impact and consequences of data  Ability to comprehend and apply the importance of lifelong learning  Ability to monitor professional current issues  Ability to conduct scientific research independently or under the supervision of a consultant | | | | | |
| **TEXTBOOK** | | | | | | Gazi Mustafa Kemal Atatürk, Nutuk (Söylev), C. I-II, TTK., Ank., 1986. İmparatorluktan Ulus Devlete Türk İnkılâp Tarihi, Cemil Öztürk (ed.), Ank., 2011. | | | | | |
| **OTHER REFERENCES** | | | | | | \* Ateş,Toktamış.(2001)Türk Devrim Tarihi.İstanbul:Der Yayınları. \*  Aybars,Ergün.(200)Türkiye Cumhuriyeti Tarihi.İzmir:Ercan Kitabevi. \*  Eroğlu,Hamza.(1990)Türk İnkılasp Tarihi.Ankara:Savaş Yayınları. \*  Kongar,Emre.(1999)Devrim Tarihi ve Toplumbilim Açısından  Atatürk.İstanbul.Remzi Kitabevi. \* Selek,sebahattin.(1987)Anadolu  İhtilali.İstanbul:Kastaç A.Ş.Yayınları. \* Şamsutdinov,A.M.(1999)Mondros'tan  Lozan'aTürkiye Ulusal Kurtuluş Savaşı Tarihi (1918-1923)Çeviren:Ataol Behramoğlu.İstanbul:Doğan Kitapçılık. \* Timur,Taner.(1997)Türk Devrimi ve Sonrası.Ankara:İmge Kitabevi. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Strategy of the Turkish Revolution | | | | | | | | | | |
| 2 | Treaty of Sèvres and Lausanne | | | | | | | | | | |
| 3 | Two Great Revolutions in the Political Field | | | | | | | | | | |
| 4 | Multi-Party Implementation Attempt | | | | | | | | | | |
| 5 | Some Domestic Political Events (TCF and Takrir-i Sükun Period) | | | | | | | | | | |
| 6 | Turkish Legal Revolution | | | | | | | | | | |
| 7 | Education and Cultural Revolution | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Revolutions Made in the Field of Economics | | | | | | | | | | |
| 10 | Revolutions in Social Structure and Health | | | | | | | | | | |
| 11 | Foreign Policy of the Republic of Turkey | | | | | | | | | | |
| 12 | The Threat of Psychological Operations Against University Youth | | | | | | | | | | |
| 13 | Ataturk's Principles and Threats to These Principles | | | | | | | | | | |
| 14 | Activities in the Field of Higher Education and University Reform | | | | | | | | | | |
| 15 | Strategy of the Turkish Revolution | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  |  | X |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 5 | 5 |
| Total Workload (Hours) |  |  | 66 |
| Total Workload (Hours)/30 |  |  | 2,2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314004 | **COURSE NAME** | DIFFERENTIAL EQUATIONS II |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY (**X**) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE (S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Applications of second order linear differential equations with constant coefficients;serial solutions of linear differential equations, linear differential equation systems. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of this course, students gain skills necessary to solve the differential equations | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Enhance the horizons of Mathematics | | | | | |
| **COURSE OUTCOMES** | | | | | | 1 Using the science of physical infrastructure of the differential equation.   1. Analysis to explain natural phenomena. 2. To define related problems, formulate and solve. 3. Understanding of scientific methods and research skills. 4. Information interdisciplinary association and application. 5. Understand professional and ethical responsibility. 6. Understand the importance of lifelong learning and practice. 7. Courses with a relevant professional qualification and knowledge of contemporary issues of ownership. | | | | | |
| **TEXTBOOK** | | | | | | Özer, N. ve, Eser, D. “Diferensiyel Denklemler”, Eskişehir 2002. | | | | | |
| **OTHER REFERENCES** | | | | | | Zill, D. G., Differential equations with boundary-value problems. USA: PWS, 1986. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Applications of second order linear differential equations with constant coefficients | | | | | | | | | | |
| 2 | Applications of second order linear differential equations with constant coefficients | | | | | | | | | | |
| 3 | Applications of second order linear differential equations with constant coefficients | | | | | | | | | | |
| 4 | Applications of second order linear differential equations with constant coefficients | | | | | | | | | | |
| 5 | Applications of second order linear differential equations with constant coefficients | | | | | | | | | | |
| 6 | Serial solutions of linear differential equations | | | | | | | | | | |
| 7 | Solutions of differential equations with Laplace transform | | | | | | | | | | |
| 8 | Midterm Exam | | | | | | | | | | |
| 9 | Solutions of differential equations with Laplace transform | | | | | | | | | | |
| 10 | Solutions of differential equations with Laplace transform | | | | | | | | | | |
| 11 | Solutions of differential equations with Laplace transform | | | | | | | | | | |
| 12 | Solutions of systems of differential equations | | | | | | | | | | |
| 13 | Solutions of systems of differential equations | | | | | | | | | | |
| 14 | Solutions of systems of differential equations | | | | | | | | | | |
| 15 | Solutions of systems of differential equations | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  |  | X |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 20 | 20 |
| Total Workload (Hours) |  |  | 128 |
| Total Workload (Hours)/30 |  |  | 4,27 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):**

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314005 | **COURSE NAME** | INTRODUCTION TO ELECTRONICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY (X) ELECTIVE ( ) | |  |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Current, voltage and resistance, Kirchoff current voltage theorems, capacitors, coils Thevenin and Norton equivalent circuit theorem, capacitors, coils, Alternating current circuits, complex impedance and phasor, current voltage diagrams, RC and RL filter circuits, History of electronics, semiconductors, pn junction and its properties, diodes, diode applications, filter and clipping circuits, rectifiers, transistors and mosfets, metal semiconductor contacts. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To recognize electrical circuit elements, to teach their importance in technology and to teach dc and ac circuit solution methods. To learn semiconductors, pn junction structures, diodes, rectifiers, filter and clipping circuits, transistors and mosfets, metal semiconductor contacts. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To have knowledge about direct current circuits and circuit elements, to apply circuit theorems and analysis methods, to apply rectifiers, filter and clipping circuits, transistors and mosfets, metal semiconductor contacts in electrical and electronic circuits | | | | | |
| **COURSE OUTCOMES** | | | | | | Ability to apply knowledge of basic sciences (Mathematics, Physics, Chemistry). Ability to identify, formulate and solve problems in the relevant branch. Ability to analyze and evaluate data. Ability to relate and apply knowledge interdisciplinary. The ability to directly relate and apply the acquired knowledge to technology and industry. The ability to comprehend and apply the importance of lifelong learning. Ability to follow professional current issues | | | | | |
| **TEXTBOOK** | | | | | | Robert Boyslad and Louis Nashelsky , Elektronik elemanlar ve devre teorisi, | | | | | |
| **OTHER REFERENCES** | | | | | | James J. Brophy, Fenciler için temel elektronik | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Current, voltage and resistance | | | | | | | | | | |
| 2 | Kirchoff current voltage theorems | | | | | | | | | | |
| 3 | superposition principle | | | | | | | | | | |
| 4 | Thevenin and Norton equivalent circuit theorem | | | | | | | | | | |
| 5 | With Capacitor and Coils | | | | | | | | | | |
| 6 | alternating current circuits, | | | | | | | | | | |
| 7 | Complex impedance and phasor, | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | semiconductors | | | | | | | | | | |
| 10 | pn junction and its properties, | | | | | | | | | | |
| 11 | diodes | | | | | | | | | | |
| 12 | diode applications, | | | | | | | | | | |
| 13 | Filter and clipping circuits, rectifiers, | | | | | | | | | | |
| 14 | Metal semiconductor contacts. | | | | | | | | | | |
| 15 | Transistors | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 |  |
| Final exam and Preparation | 1 | 20 |  |
| Total Workload (Hours) |  |  | 114 |
| Total Workload (Hours)/30 |  |  | 3.8 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):**

**Signature**:  **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314006 | **COURSE NAME** | INTRODUCTION TO ELECTRONICS LABORATORY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 0 | | 0 | 2 | | 1 | 2 | COMPULSORY ( X ) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 20 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 14 | 30 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Resistance, current and voltage in a combined circuit; Thevenin's theorem; capacitors; RC circuits; Inductors; Phase shift circuits; Impedance; Resonant circuits, Diode rectifier; capacitor as a filter; Clipper and clamping circuits; Zener diode; solid state devices; Triac; Light-emitting diode (LED)/ Opto-dual | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of the course is to recognize electrical circuit elements, to give basic electronics knowledge, to make them comprehend the importance of technology and to teach DC and AC circuit solution methods practically. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Learning the basic electrical circuit elements, establishing electrical circuits and using electrical circuit equipment  To be able to define the basic electronic elements, to learn the basic properties of diodes and their types, to learn the working principles of solid state devices. | | | | | |
| **COURSE OUTCOMES** | | | | | | Ability to apply knowledge of basic sciences (Mathematics, Physics, Chemistry)  Ability to identify, formulate and solve problems in the relevant branch  Ability to analyze, evaluate, experiment and design data  Ability to relate and apply knowledge interdisciplinary  Ability to directly relate and apply acquired knowledge with technology and industry  ability to work in a team  Ability to comprehend and apply the importance of lifelong learning  Ability to monitor professional current issues | | | | | |
| **TEXTBOOK** | | | | | | 1. Elektrik devre analizi laboratuvarı deney föyü 2. Elektroniğe Giriş laboratuvarı deney föyü | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Uğur Arifoğlu, DC Devreler 2. Uğur Arifoğlu, AC Devreler 3. Robert Boyslad and Louis Nashelsky, Elektronik elemanlar ve devre teorisi, 4. James J. Brophy, Fenciler için temel elektronik | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projection and computer | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Presentation and use of report writing, graph drawing, virtual lab. program and measuring instruments | | | | | | | | | | |
| 2 | Resistance, current and voltage in a combined circuit | | | | | | | | | | |
| 3 | Thevenin's theory | | | | | | | | | | |
| 4 | Capacitors - RC circuits | | | | | | | | | | |
| 5 | Inductors - Impedance | | | | | | | | | | |
| 6 | Phase shift circuits | | | | | | | | | | |
| 7 | Resonant circuits | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Diode rectifier | | | | | | | | | | |
| 10 | Capacitor as a filter | | | | | | | | | | |
| 11 | Clipper and clamper circuits | | | | | | | | | | |
| 12 | Zener diode | | | | | | | | | | |
| 13 | Solid state devices | | | | | | | | | | |
| 14 | Triac | | | | | | | | | | |
| 15 | Light-emitting diode (LED)/ Opto-dual | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 1 | 12 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) | 13 | 1 | 13 |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 4 | 4 |
| Final exam and Preparation | 1 | 4 | 4 |
| Total Workload (Hours) |  |  | 61 |
| Total Workload (Hours)/30 |  |  | 2.03 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Murat Kellegöz, Ph.D.

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314003 | **COURSE NAME** | MATHEMATICAL METHODES IN PHYSICS II |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 4 | | 0 | 0 | | 4 | 6 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Fourier series; linear tranformations; curvilinear coordinates; calculus of variations; complex variable functions;integral tranforms. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To define the mathematics which is required to express, understand and formulate physics basic concepts. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects | | | | | |
| **COURSE OUTCOMES** | | | | | | Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) | | | | | |
| **TEXTBOOK** | | | | | | Boas, M. L. (1993). Mathematical Methods in the Physical Sciences. New York: John Wiley&Sons. | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Önem, C. (2003). Mühendislik ve Fizikte Matematik Metodlar. İstanbul: Birsen Yay. 2. Karaoğlu, B. (1994). Fizik ve Mühendislikte Matematik Yöntemler. İstanbul: Bilgi Tek Yay. 3. Özemre, A.Y. (1983). Fizikte matematik metodlar. İstanbul: İstanbul Üniversitesi Fen Fakültesi Yayınları. 4. Kreyszig, E. (1994). Advanced Engineering Mathematics. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Fourier series; average value of a function; Fourier coefficient | | | | | | | | | | |
| 2 | Drichlet condition; even and odd functions; Parseval theorem | | | | | | | | | | |
| 3 | Integral and differantial of Fourier series; Linear transformations; orthogonal tranformations | | | | | | | | | | |
| 4 | Digonalizing matrices; applications of diagonalization | | | | | | | | | | |
| 5 | Digonalizing matrices; applications of diagonalization | | | | | | | | | | |
| 6 | Curvilinear coordinates;scale factors and basis vectors for orthogonal systems | | | | | | | | | | |
| 7 | Vector operators in orthogonal curvilinear coordinates | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Calculus of variations;Eular equation and applications | | | | | | | | | | |
| 10 | Several dependent variables; Lagrange’ equations; Isoperimetric problems; Variational notation | | | | | | | | | | |
| 11 | Several dependent variables; Lagrange’ equations; Isoperimetric problems; Variational notation | | | | | | | | | | |
| 12 | Complex variable functions; Analytic functions, Contour integrals | | | | | | | | | | |
| 13 | Laurent series; Residue theorem; Methods of finding residues | | | | | | | | | | |
| 14 | Integral tranforms; Laplace tranform | | | | | | | | | | |
| 15 | Fourier tranform | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  |  | X |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 167 |
| Total Workload (Hours)/30 |  |  | 5.57 |
| ECTS Credits of the Course |  |  | 6 |

**Instructor(s):** Doç. Dr. Şadan Korkmaz

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314001 | **COURSE NAME** | MODERN FİZİK |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY (X) ELECTIVE ( ) | | Türkçe |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 50 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | There are no prerequisites for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Special theory of relativity, Galileo and Lorentz transformations, relative mechanic, atomic structure of matter, quantization of light, black-body radiation, photoelectric effect, waves and particles, de Broglie Hypothesis, uncertainty principle, wave mechanics, X-rays and Bragg diffraction, Compton effect, Bohr-Sommerfeld atomic theory, comparison of wave mechanic and results of Bohr theory, quantum theory of hydrogen atom, vector model of atom and electron system, molecular structure, molecule spectra; nuclear structure and radioactivity. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Learning transition to Modern Physics from Classical Physics and the basic principles and concepts of Relativistic and Quantum Physics. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Narrating some fundamental concepts of physics in order to understand the nature better and trying to improve their point of views of life itself. | | | | | |
| **COURSE OUTCOMES** | | | | | | Learning basic principles and concepts related to modern physics Attaining the skill to implement information related to basic sciences such as Mathematics, Physics and Chemistry.  Achieving the skill to explain and analyze natural phenomena.  Recognizing, formulating and solving the problems related to the structure of matter.  The skill to interpret the basic concepts rather than details.  The skill to associate and implement information with a multidisciplinary approach.  The skill to follow-up current professional events | | | | | |
| **TEXTBOOK** | | | | | | Beiser, A. (1969). Perspectives of Modern Physics. McGraw-Hill. | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Gündüz, E. (1999). Modern Fiziğe Giriş. İzmir: Ege Üniv. Fen Fak. Kitaplar Serisi No:110. 2. Taylor, J.R., Zafaritos, C. (1996). Modern Fizik. İstanbul: Arte Güven. 3. Eisberg, R., Resnick, R. (1974). Quantum physics of atoms, molecules, solids, nuclei and particles. New York: John Wiley & Sons.  4. Aygün, E., Zengin D.M. (1990). Kuantum Fiziği. Ankara: Bilim yayınevi | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Basic principles and concepts related to modern physics | | | | | | | | | | |
| 2 | Theory of special relativity, Galileo and Lorentz transformations | | | | | | | | | | |
| 3 | Relative mechanics | | | | | | | | | | |
| 4 | Atomic structure of matter | | | | | | | | | | |
| 5 | Quantization of light | | | | | | | | | | |
| 6 | Black-body radiation, Photoelectric effect | | | | | | | | | | |
| 7 | Compton effect, pair production, X-ray | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Waves and particles, de Broglie Hypothesis, uncertainty principle | | | | | | | | | | |
| 10 | Atom models | | | | | | | | | | |
| 11 | Bohr-Sommerfeld atomic theory, comparisons of wave mechanics and the results of Bohr theory | | | | | | | | | | |
| 12 | Quantum theory of hydrogen atom | | | | | | | | | | |
| 13 | Vector model and electron system of atom | | | | | | | | | | |
| 14 | Nuclear structure and radioactivity | | | | | | | | | | |
| 15 | Elementary particles | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 30 | 30 |
| Final exam and Preparation | 1 | 40 | 40 |
| Total Workload (Hours) |  |  | 154 |
| Total Workload (Hours)/30 |  |  | 5.13 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Assoc. Prof. Gökhan KILIÇ

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314011 | **COURSE NAME** | NOBEL PRIZES IN PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** | |
| 4 | | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish | |
| **COURSE CATEGORY** | | | | | | | | | | | | | |
| **Basic Science** | | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** | |
|  | | | |  | | | X | | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | | |
| **MID-TERM** | | | | | | | **Evaluation Type** | | | | **Quantity** | **%** | |
| 1st Mid-Term Exam | | | | 1 | 20 | |
| 2nd Mid-Term Exam | | | | - | - | |
| Quiz | | | | - | - | |
| Homework | | | | 1 | 20 | |
| Project | | | | - | - | |
| Report | | | | - | - | |
| Others (Presentation) | | | | 1 | 20 | |
| **FINAL EXAM** | | | | | | | Test | | | | 1 | 40 | |
| **PREREQUISITE(S)** | | | | | | | There is no prerequisite or co-requisite for this course. | | | | | | |
| **COURSE DESCRIPTION** | | | | | | | The history of the Nobel prizes, the scientists who contributed to the science of physics from the 1900s to the present, the examination of the studies nominated for the Nobel prize, the creation of predictions about the subjects that are open to development. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | | Introducing the scientists who received the Nobel prize in physics, creating individual and group discussions, presentations and Brainstorming as a result of the lectures. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | | 1. Students know why Nobel Prizes are given in Physics. 2. Students comprehend the importance of Nobel prizes in physics. 3. Students learn scientists and their studies. 4. Students have knowledge of current Physics study subjects. 5. Students know the distribution of Nobel prizes by years, considering the study subjects in the field of physics. 6. Considering the Nobel Prizes in Physics, students can make predictions about more open topics in the future. | | | | | | |
| **COURSE OUTCOMES** | | | | | | | 1. It encourages physicists to do research. 2. It provides an understanding of which studies have been awarded the Nobel Prizes. 3. It allows students to learn about scientists and important studies that shape history. 4. Students understand the importance of the work done, learns the application areas. | | | | | | |
| **TEXTBOOK** | | | | | | | A.W. Levinovitz, N. Ringertz, The Nobel Prize The First 100 years, Imperial College Press. | | | | | | |
| **OTHER REFERENCES** | | | | | | | 1. Basic Physics Books, Popular physics books 2. Inventions That Make Our Lives Easier, TUBITAK publications 3. Internet resources | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | | - | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | | |
| 1 | Developmental stages of physics from past to present | | | | | | | | | | | | |
| 2 | Sub-Fields of Physics, Alfred Nobel and the fields where Nobel prizes were awarded | | | | | | | | | | | | |
| 3 | Nobel laureates in 1900-1910 and their contributions to science | | | | | | | | | | | | |
| 4 | Nobel laureates in 1911-1920 and their contributions to science | | | | | | | | | | | | |
| 5 | Nobel laureates in 1921-1930 and their contributions to science | | | | | | | | | | | | |
| 6 | Nobel laureates in 1931-1940 and their contributions to science | | | | | | | | | | | | |
| 7 | Nobel laureates in 1941-1950 and their contributions to science | | | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | | | |
| 9 |  | Nobel laureates in 1951-1960 and their contributions to science | | | | | | | | | | |  |
| 10 |  | Nobel laureates in 1961-1970 and their contributions to science | | | | | | | | | | |  |
| 11 |  | Nobel laureates in 1971-1980 and their contributions to science | | | | | | | | | | |  |
| 12 |  | Nobel laureates in 1981-1990 and their contributions to science | | | | | | | | | | |  |
| 13 | Nobel laureates in 1991-2000 and their contributions to science | | | | | | | | | | | | |
| 14 | Nobel laureates in 2001-2010 and their contributions to science | | | | | | | | | | | | |
| 15 | Nobel laureates in 2010-present and their contributions to science. | | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 10 | 1 | 10 |
| Homework | 1 | 5 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 10 | 10 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 73 |
| Total Workload (Hours)/30 |  |  | 2.43 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Erkan İLİK, Ph.D.

**Signature**:

**Date:**19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314012 | **COURSE NAME** | NUMERICAL PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** | |
| 4 | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish | |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)**  **]** | | | | | **Social Science** | |
|  | | |  | | | X | | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** | |
| 1st Mid-Term Exam | | | | 1 | 20 | |
| 2nd Mid-Term Exam | | | |  |  | |
| Quiz | | | |  |  | |
| Homework | | | | 1 | 20 | |
| Project | | | |  |  | |
| Report | | | |  |  | |
| Others (………) | | | |  |  | |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 | |
| **PREREQUISITE(S)** | | | | | |  | | | | | | |
| **COURSE DESCRIPTION** | | | | | | Numerical solutions and analysis of univariate functions, Interpolation,  Numerical Derivation, Numerical Integral, Differential Equations, Linear Equations, Eigenvalue, and Eigenvector Problems, Nonlinear Equation Systems, Partial Differential Equations. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | Examining and discussing numerical methods are frequently encountered in physics using various examples. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Simulating physical applications in computer environment,  Realizing the solution to physics problems using computer programs will give the student a different perspective. | | | | | | |
| **COURSE OUTCOMES** | | | | | | To be able to formulate the problems in physics numerically.  To be able to apply basic data analysis methods.  To be able to apply stochastic techniques to numerical problems.  Learning how to fit.  Learning to take numerical differentiation and integration.  Learning to solve ordinary differential equations. | | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | | |
| **OTHER REFERENCES** | | | | | | 1. DeVries P. L. (1994). A First Course in Computational Physics. New York: John Wiley & Sons Inc. 2. Altaç, Z. & Gürkan, İ. (1995). Mühendisler için Fortran Proglamlama. Eskişehir: ESOGÜ Yayınları. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projection and computer | | | | | | |
|  | | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | | **TOPICS** | | | | | | | | | | |
| 1 | | Course, operation and computer program introduction | | | | | | | | | | |
| 2 | | Features of numerical calculation, types of errors | | | | | | | | | | |
| 3 | | Basic derivative and integral | | | | | | | | | | |
| 4 | | Basic derivative and integral application | | | | | | | | | | |
| 5 | | Rooting method | | | | | | | | | | |
| 6 | | Rooting method app | | | | | | | | | | |
| 7 | | Differential equations | | | | | | | | | | |
| 8 | | Mid-term exam | | | | | | | | | | |
| 9 | | Differential equations applications | | | | | | | | | | |
| 10 | | Matrix | | | | | | | | | | |
| 11 | | Matrix applications | | | | | | | | | | |
| 12 | | Data analysis | | | | | | | | | | |
| 13 | | Data analysis applications | | | | | | | | | | |
| 14 | | Random events and simulation | | | | | | | | | | |
| 15 | | Random events and simulation applications | | | | | | | | | | |
| 16,17 | | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 2 | 28 |
| Homework | 12 | 6 | 6 |
| Project (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Report (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Presentation (including preparation time) | 0 | 0 | 0 |
| Quiz and preparation (Quiz) | 0 | 0 | 0 |
| Midterm and preparation | 1 | 3 | 3 |
| Final exam and Preparation | 1 | 3 | 5 |
| Total Workload (Hours) |  |  | **70** |
| Total Workload (Hours)/30 |  |  | **2.3** |
| ECTS Credits of the Course |  |  | **2** |

**Instructor(s):** Murat Kellegöz, Ph.D.

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314009 | **COURSE NAME** | THERMAL PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Fundamental concepts; the laws of Thermodynamics; temperature; thermal equilibrium; heat flux; equation of heat conduction and its solution methods; heat transfer by conduction; heat transfer by radiation; heat transfer by convection; heat exchangers. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To learn of fundamentals of the heat transfer and calculations | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To learn and apply heat transfer calculations and applications. | | | | | |
| **COURSE OUTCOMES** | | | | | | Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) Identify, formulate, and solve field related problems Design and conduct experiments as well as to analyze and interpret data Interdisciplinary knowledge association and application Direct correlation and application of gained knowledge with technology and industry Get a recognition of the need for, and an ability to engage in life-long learning Gain a knowledge of contemporary issues | | | | | |
| **TEXTBOOK** | | | | | | Çengel, Y. A. (2003). Heat transfer: A practical approach. Boston: McGraw Hill. | | | | | |
| **OTHER REFERENCES** | | | | | | Incropera, P.F. Dewitt, D.P. (2001). Introduction to heat transfer. New York: John Wiley & Sons. Çengel, Y. A. (1997). Introduction to thermodynamics and heat transfer. Boston: McGraw Hill. Kakaç, S. (1982). Örneklerle Isı Transferi. Ankara: Güven Kitapevi. Özemre, A. Y. (1987). Isı teorisi. İstanbul: İstanbul Üniversitesi Yayınları.  Saraç, C. (1985). Termodinamik Prensibleri. İzmir: Ege Üniversitesi Yayınları. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Fundamental concepts of the course | | | | | | | | | | |
| 2 | Thermodynamics laws | | | | | | | | | | |
| 3 | Thermodynamics laws | | | | | | | | | | |
| 4 | Heat and other forms of energy | | | | | | | | | | |
| 5 | Thermodynamic and heat transfer | | | | | | | | | | |
| 6 | Thermal equilibrium; heat flux | | | | | | | | | | |
| 7 | Equation of heat conduction and its solution methods | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Thermal Contact Resistance | | | | | | | | | | |
| 10 | Heat transfer by conduction | | | | | | | | | | |
| 11 | Heat transfer by conduction | | | | | | | | | | |
| 12 | Heat transfer by convection | | | | | | | | | | |
| 13 | Heat transfer by convection | | | | | | | | | | |
| 14 | Heat transfer by radiation, heat exchangers. | | | | | | | | | | |
| 15 | Heat transfer by radiation, heat exchangers. | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework | 1 | 5 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 57 |
| Total Workload (Hours)/30 |  |  | 2.07 |
| ECTS Credits of the Course |  |  | 2 |

**Dersin Öğretim Üyesi:** Prof. Dr. Suat PAT **Tarih:**19.08.2022

**İmza**:

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314010 | **COURSE NAME** | INTRODUCTION TO ATMOSPHERIC PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE ( X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
| X | | |  | | |  | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Big Bang Theory, Universe, Solar System, Sun, Solar Winds,  Geomangetisma, Gravitaion, Magnetosphere, Atmosphere, İonosphere, Propogation of Radio Wave, Space vehicle processing . | | | | | |
| **COURSE OBJECTIVES** | | | | | | To define the knowledge which is required to express, understand and formulate atmospheric physics basic concepts. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | | To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects | | | | | |
| **COURSE OUTCOMES** | | | | | | Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) | | | | | |
| **TEXTBOOK** | | | | | | -Guido Visconti (2016), Fundementals of Physics and Chemistry of the Atmosphere, Switzerland, Springer Int. Publishing. | | | | | |
| **OTHER REFERENCES** | | | | | | -Aslan, Z., Topçu, S., Barla, C. Ve Özdemir, G. (2004), Atmosfer Fiziği, İstanbul: Papatya Yayınları. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Big Bang Theory, Expansion of Universe, Stars and Planets | | | | | | | | | | |
| 2 | Universe, Dark Matter, Dark Energy, Visible Universe, Solar System, Planets | | | | | | | | | | |
| 3 | Sun, Structure of Sun, Fusion reactions, Explosion of the sun | | | | | | | | | | |
| 4 | State of Gas and Plasma, Motion of Charged particle, transition of charged particles inside gas | | | | | | | | | | |
| 5 | Solar Winds, Magnetic field of Sun, Motion of charged particles in magnetic field | | | | | | | | | | |
| 6 | Magnetic field of Earth, Van Allen Belts, Aurora | | | | | | | | | | |
| 7 | Troposphere, Stratosphere, Mezosphere, Ozonosphere, Kemosphere, Termosphere, Exsosphere | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Gravitation, Magnetosphere | | | | | | | | | | |
| 10 | Troposphere, Stratosphere, Mezosphere, Ozonosphere, Kemosphere, Termosphere, Exsosphere | | | | | | | | | | |
| 11 | Atmospheric phenomena | | | | | | | | | | |
| 12 | İonosphere | | | | | | | | | | |
| 13 | Electromagnetic waves | | | | | | | | | | |
| 14 | Propagation of radio wave | | | | | | | | | | |
| 15 | Space vehicle processings | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework | 1 | 5 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) | 31 | 28 | 67 |
| Total Workload (Hours)/30 |  |  | 2.2 |
| ECTS Credits of the Course |  |  | 2 |

**Instructor(s):** Prof. Dr. Tamer AKAN

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314008 | **COURSE NAME** | HISTORY OF SCIENCE IN PHYSICS II |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | 2 | | 0 | 0 | | 2 | 2 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | Modern science; at the beginning of the century 20th natural sciences, Einstein's theories;  Special and General Relativity;  Detailed examination of the birth of quantum theory  During the century 20. scientific discoveries that marked the history of science and scientists. | | | | | |
| **COURSE OBJECTIVES** | | | | | The main objective of this course, as the periodic phases of science philosophy of science, and cultural structure that period by evaluating the time, scientists have reached includes examining how scientific findings. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Developed and implemented to-date studies will facilitate the transfer of modern science. | | | | | |
| **COURSE OUTCOMES** | | | | | 1. Philosophical approach to the historical development of physics and natural sciences, 2. Taking in conjunction with scientists learn more about the conditions of their day, 3. Being motivated by love of science and scientific work, | | | | | |
| **TEXTBOOK** | | | | | Cemal Yıldırım. (1997). Bilim Tarihi. İstanbul: Remzi Kitapevi | | | | | |
| **OTHER REFERENCES** | | | | | 1. Sevim Tekeli, Esin Kaya, Remzi Demir, H. Gazi Tepdemir, Yavuz Unat. (1997). Bilim Tarihi. İstanbul: Doruk Yayınları 2. A. O. Gürel (2001). Doğa Bilimleri Tarihi. Ankara: İmge Kitapevi 3. Cemal Yıldırım. (1996). Bilimin Öncüleri. Ankara: Tübitak Yayınları 4. Infeld, L. (Çeviri: Cemal Yıldırım / 1999). Albert Einstein/Bilimsel Kişiliği ve Dünyamıza Etkisi. İstanbul: Bilgi Yayınevi | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | - | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | General Information about Modern Science |
| 2 | At the beginning of 20. the century natural sciences |
| 3 | At the beginning of 20. the century natural sciences |
| 4 | Einstein's theories |
| 5 | Einstein's theories |
| 6 | Special and General Relativity |
| 7 | Special and General Relativity |
| 8 | Mid-term exam |
| 9 | Detailed examination of the birth of quantum theory |
| 10 | Detailed examination of the birth of quantum theory |
| 11 | Detailed examination of the birth of quantum theory |
| 12 | Scientific discoveries during the 20th century that marked the history of science |
| 13 | Scientific discoveries during the 20th century that marked the history of science |
| 14 | Scientific discoveries during the 20th century that marked the history of science |
| 15 | Scientists who Contributions to science |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 1 | 14 |
| Homework | 1 | 2 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 5 | 10 |
| Total Workload (Hours) |  |  | 62 |
| Total Workload (Hours)/30 |  |  | 2.07 |
| ECTS Credits of the Course |  |  | 2 |

Doç. Dr. Şadan Korkmaz

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314014 | **COURSE NAME** | METHODS OF SPECTRAL ANALYSIS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 2 | | 0 | 0 | | 2 | 3 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Definition of spectroscopy, Basic elements used in spectroscopy, "signal-noise" relationship in the spectrum, Lambert-Beer Law, Absorption, Transmittance, Spectral methods and basic information about their applications. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To give the interaction of light and matter in different parts of the electromagnetic spectrum and its applications in order to determine the structures and characteristics of materials. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To be able to determine a method for the characterization of materials using basic spectral analysis methods. | | | | | |
| **COURSE OUTCOMES** | | | | | | To learn spectral analysis methods according to electromagnetic spectrum and spectrum regions. | | | | | |
| **TEXTBOOK** | | | | | | Spektroskopi ve Lazerlere Giriş, Prof. Dr. Fevzi Köksal, Dr. Rahmi Köseoğlu | | | | | |
| **OTHER REFERENCES** | | | | | | Fundementals of molecular Spectroscopy, C. N. Banwell | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Spectroscopy history | | | | | | | | | | |
| 2 | Basic elements used in spectroscopy | | | | | | | | | | |
| 3 | The “signal-noise” relationship in the spectrum | | | | | | | | | | |
| 4 | Lambert-Beer Law | | | | | | | | | | |
| 5 | Rotation Spectroscopy (Microwave Spectroscopy) | | | | | | | | | | |
| 6 | Infrared Spectroscopy | | | | | | | | | | |
| 7 | Raman Spectroscopy | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Spectrum Analysis | | | | | | | | | | |
| 10 | Electronic Spectroscopy | | | | | | | | | | |
| 11 | UV-Visible Spectroscopy | | | | | | | | | | |
| 12 | X-ray spectroscopy | | | | | | | | | | |
| 13 | Moseley's Law | | | | | | | | | | |
| 14 | Mössbauer Spectroscopy | | | | | | | | | | |
| 15 | fluorescence and phosphorescence | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework | 1 | 5 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 76 |
| Total Workload (Hours)/30 |  |  | 2.53 |
| ECTS Credits of the Course |  |  | 3 |

Prof. Dr. Güneş Süheyla KÜRKÇÜOĞLU

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821314013 | **COURSE NAME** | ASTROPHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 4 | | 2 | | 0 | 0 | | 2 | 3 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Universal gravitational laws, evolution of the universe and formation of chemical elements, evolution of stars, expanding universe. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To comprehend the structure and components of the universe and solar system. Recognizing the universe we live in, and explaining the scientific studies of scientists about its formation and structure. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Ensuring that the studies in modern science are developed and transferred to current life. | | | | | |
| **COURSE OUTCOMES** | | | | | | Learn the general structure of the universe  Explain the structure of the solar system using Keppler's laws.  Explain the structures of celestial bodies such as planets, stars, satellites and meteors that make up the universe. | | | | | |
| **TEXTBOOK** | | | | | | 1. Fen ve Mühendislik için Fizik. Cilt I (Bölüm 14 Evrensel Çekim   Kanunu) Serway R. A. Çeviri Editörü: Çolakoğlu, K. Palme Yayıncılık. Ankara 1995 ISBN 978 975 74 776 8   1. Astronomi: Bir bakışta Evren. Chaisson E., Mcmillan S.,Çev. Editörü   (Yıldız M.) Nobel Yaşam 2016 Ankara ISBN 978 605 9746 09 0 | | | | | |
| **OTHER REFERENCES** | | | | | | Temel Fizik. Cilt I (Bölüm 12 Kütle Çekimi) Fishbane, P.M., Gasiorowicz, S., & Thornton, S.T. (Çeviri Editörü: Türkoğulları, Ü.), Arkadaş Yayınevi 2006 Ankara. ISBN 975 50 9368 0 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Newton's Law of Universal Gravitation | | | | | | | | | | |
| 2 | Measuring the gravitational constant Cavendish Experiment | | | | | | | | | | |
| 3 | Keppler's Laws, the Law of Universal Gravitation, and the Motion of the Planets | | | | | | | | | | |
| 4 | Gravity Field, Gravitational Potential Energy | | | | | | | | | | |
| 5 | Energy Conservation in planet and satellite movements | | | | | | | | | | |
| 6 | The gravitational force between a large mass and a Spherical mass and a particle | | | | | | | | | | |
| 7 | The gravitational force between a large mass and a Spherical mass and a particle | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | To comprehend the structure and components of the universe and solar system. | | | | | | | | | | |
| 10 | Galaxies | | | | | | | | | | |
| 11 | Solar system, Formation and structure, Planets and their properties | | | | | | | | | | |
| 12 | Planets and their properties | | | | | | | | | | |
| 13 | Stars, their formation and evolutionary processes | | | | | | | | | | |
| 14 | Stars, their formation and evolutionary processes | | | | | | | | | | |
| 15 | Asteroids, Meteorites, Comets | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 2 | 28 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework | 1 | 5 | 5 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 76 |
| Total Workload (Hours)/30 |  |  | 2.53 |
| ECTS Credits of the Course |  |  | 3 |

Doç. Dr. Şadan Korkmaz

# ESOGÜ Physics Department Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315003 | **COURSE NAME** | ELECTROMAGNETIC THEORY |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** | |
| 5 | | | 4 | | 0 | 0 | | 4 | 7 | COMPULSORY (X) ELECTIVE ( ) | | Turkish | |
| **COURSE CATEGORY** | | | | | | | | | | | | | |
| **Basic Science** | | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** | |
| X | | | |  | | | X | | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | | |
| **MID-TERM** | | | | | | | **Evaluation Type** | | | | **Quantity** | **%** | |
| 1st Mid-Term Exam | | | | 1 | 30 | |
| 2nd Mid-Term Exam | | | |  |  | |
| Quiz | | | |  |  | |
| Homework | | | | 1 | 20 | |
| Project | | | |  |  | |
| Report | | | |  |  | |
| Others (………) | | | |  |  | |
| **FINAL EXAM** | | | | | | |  | | | | 1 | 50 | |
| **PREREQUISITE(S)** | | | | | | | - | | | | | | |
| **COURSE DESCRIPTION** | | | | | | | Vector Analysis, Coulomb’s Law and Electric Field Intensity, Electric  Flux Density, Gauss Law and Divergence, Energy and Potential, Conductors, Dielectrics and Capacitance, Magnetic Field and BiotSavart Law. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | | To enable students to understand the basic concepts of electromagnetic theory and to improve their problem solving skill | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | | In practice, to solve various problems of physical systems within the limits of classical electromagnetic theory by using different methods and to improve their ability to apply in daily life. | | | | | | |
| **COURSE OUTCOMES** | | | | | | | Learning to use different methods to solve various physical problems | | | | | |  |
|  | | | | | |
| **TEXTBOOK** | | | | | | | Engineering Electromagnetics, W.H.Hayt, Boston, 2001 | | | | | | |
| **OTHER REFERENCES** | | | | | | | Elektromanyetik Teori, D.J.. Griffiths (Çev. B. ÜNAL), Gazi Kitabevi, Ankara, 2005  Elektromanyetik, J.A.Edminister (Çev. M.T.AYDEMİR v.d.), Nobel Yayın Dağıtım, Ankara, 2000. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | | Computer and Projector | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | | |
| 1 |  | Scalars and Vectors, Coordinate Systems | | | | | | | | | | |  |
| 2 |  | The Dot and Cross Product | | | | | | | | | | |  |
| 3 |  | Electric Field of Charge Distrubutions | | | | | | | | | | |  |
| 4 |  | Electrik Flux Density, Gauss’s Law | | | | | | | | | | |  |
| 5 |  | Divergence and Divergence Theorem | | | | | | | | | | |  |
| 6 |  | Energy of Moving Point Charge in an Electric Field | | | | | | | | | | |  |
| 7 |  | The Potential Field of a System of Charges | | | | | | | | | | |  |
| 8 | Mid-term exam | | | | | | | | | | | | |
| 9 |  | Potential Gradient, Energy Density in the Electrostatic Field | | | | | | | | | | |  |
| 10 |  | Current and Current Density, Conductor Properties and Boundry Conditions | | | | | | | | | | |  |
| 11 |  | The Method of Images, The Nature of Dielectric Materials, Boundry Conditons for Perfect Dielectric  Materials, Capacitance | | | | | | | | | | |  |
| 12 |  | Magnetic Field and Biot-Savart Law | | | | | | | | | | |  |
| 13 |  | Ampere’s Law, Stokes Theorem | | | | | | | | | | |  |
| 14 |  | Magnetic Flux and Magnetic Flux Density, The Scalar and Vector Magnetic Potentials | | | | | | | | | | |  |
| 15 |  | Maxwell’s Equations, Electromagnetic Wave | | | | | | | | | | |  |
| 16,17 | Final Exam | | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 200 |
| Total Workload (Hours)/30 |  |  | 6,67 |
| ECTS Credits of the Course |  |  | 7 |

**Instructor(s):** Dr.Öğr.Üyesi Ali ÇETİN

**Signature**: **Date:**19.08.2022

# ESOGÜ Physics Department Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315002 | **COURSE NAME** | CLASSIC MECHANICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 4 | | 0 | 0 | | 4 | 7 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Vector algebra, matrices, coordinate systems, relative motion, work and power, rotation, balance, gravitational acceleration | | | | | |
| **COURSE OBJECTIVES** | | | | | | To enable students to understand conceptual events related to classical mechanics and to improve their problem solving skills. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | In practice, to solve various problems of physical systems within the limits of classical physics by using different methods and to improve their application skills in daily life. | | | | | |
| **COURSE OUTCOMES** | | | | | | Learning to use different methods to solve various physical problems | | | | | |
| **TEXTBOOK** | | | | | | Klasik Mekanik, Emine Rızaoğlu, Naci Sünel, okutman yayıncılık, 2008, Mekanik , D.Mehmet Zengin, Cevat Selam, Sabit Koçak, Bilim yayıncılık, 1999  Klasik Mekanik, T.W. Kibble and F.H. Berkshire, Çvr: Kemal Çolakoğlu, Palme yaıncılık, 1999 | | | | | |
| **OTHER REFERENCES** | | | | | | Classical Mechnaics, Herbert Goldstein, Addison Wesley | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and Projector | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Vector Algebra | | | | | | | | | | |
| 2 | Coordinate Systems | | | | | | | | | | |
| 3 | Newton's Laws | | | | | | | | | | |
| 4 | Variable Mass Systems | | | | | | | | | | |
| 5 | Work, Power, Energy | | | | | | | | | | |
| 6 | Impulse, torque and angular momentum | | | | | | | | | | |
| 7 | Rotation about a fixed axis | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Virtual Jobs Policy | | | | | | | | | | |
| 10 | D'alembert Principle | | | | | | | | | | |
| 11 | Newton's Law of Gravity | | | | | | | | | | |
| 12 | Motion in a uniform force field | | | | | | | | | | |
| 13 | Lagrangian Equations, Formulation and Simple Applications | | | | | | | | | | |
| 14 | Hamilton Equations and Simple Applications | | | | | | | | | | |
| 15 | Hamilton Equations and Simple Applications | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 7 | 98 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 204 |
| Total Workload (Hours)/30 |  |  | 6.8 |
| ECTS Credits of the Course |  |  | 7 |

**Instructor(s):** Dr.Öğr.Üyesi Tevfik ÜNALDI

**Signature**:  **Date:** 19.08.2022

# ESOGÜ Physics Department Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315001 | **COURSE NAME** | QUANTUM PHYSICS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | 4 | | 0 | 0 | | | 4 | 7 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | |  |  |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | There is no prerequisite for this course. | | | | | | |
| **COURSE DESCRIPTION** | | | | | Historical view to classical physics’ insufficiencies, matter and wave, operators and their types, the postulates of quantum mechanics, the Schrödinger equation and its applications, bound and unbound states, potential barrier, finite potential well, some applications with two and three degrees of freedom, the general formalism of quantum mechanics. | | | | | | |
| **COURSE OBJECTIVES** | | | | | To introduce the principles and the general formalism of quantum mechanics, and to make their applications. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Students will learn classical physics’ insufficiencies in investigation of natural phenomena. Meanwhile, students will do solutions for these phenomena by means of the quantum mechanical point of view. Applying the quantum mechanical equations of motion to the constitutes of micro universe, students will understand its importance in daily life applications such as electronics, semiconductor technology. | | | | | | |
| **COURSE OUTCOMES** | | | | | 1. Understand the fundamental principles and concepts of quantum physics. 2. Understand natural phenomena by the quantum mechanical point of view. 3. Apply knowledge of natural sciences (Physics, Chemistry, Mathematics). 4. Justify and analyze natural phenomena. 5. Identify, formulate, and solve field related problems. 6. Interdisciplinary knowledge association and application. 7. Direct correlation and application of gained knowledge with technology and industry. 8. Get an understanding of professional and ethical responsibility. 9. Get a recognition of the need for, and an ability to engage in life-long learning. 10. Gain a knowledge of contemporary issues. | | | | | | |
| **TEXTBOOK** | | | | | Karaoğlu, B., “Kuantum mekaniğine giriş”, Seçkin Yayıncılık, Ankara, 2008. | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Griffiths, D. J., Çeviri: Özbek, H., Feyiz, S. D., “Kuantum Mekaniğine Giriş”, Nobel Yayıncılık, Ankara, 2010. 2. Gasiorowicz, S., “Quantum physics (3rd edition)”, John Wiley & Sons, | | | | | | |

|  |  |
| --- | --- |
|  | New Jersey, 2003.   1. Aygün, E., Zengin D. M., “Kuantum Fiziği”, Bilim Yayınevi, Ankara, 1992. 2. Erbil, H., “Kuantum Fiziği-I”, Ege Üniversitesi Basımevi, İzmir, 2001. 3. Budak, G., Karabulut A., “Kuantum Fiziği I”, Nobel Yayıncılık, Ankara, 2007. 4. Liboff, R. L., “Kuantum mekaniğine giriş”, Addison-Wesley Publishing Company, New York, 1988. 5. Landau, L.D., Lifshitz, E. M., Çeviri: Zengin, M. Selam, C. Korcak, S., “Kuantum Mekaniği”, Bilim Yayınları, Ankara, 2000. 6. Zettili, N., “Quantum mechanics”, John Wiley &Sons, New York, 2001. |
| **TOOLS AND EQUIPMENTS REQUIRED** | There is no tools and equipment required for this course. |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Historical view to classical physics’ insufficiencies |
| 2 | Matter and wave |
| 3 | Operators, expected values |
| 4 | The Schrödinger equation |
| 5 | Free-particle solution |
| 6 | The time-independent Schrodinger equation and its applications I |
| 7 | The time-independent Schrodinger equation and its applications II |
| 8 | Mid-term exam |
| 9 | Potential barrier, tunneling effect |
| 10 | Finite potential well and its examples |
| 11 | Harmonic oscillator I |
| 12 | Harmonic oscillator II |
| 13 | Space of wave functions |
| 14 | Superposition principle |
| 15 | Some special operators |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws, and relations between physics. | **X** |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | **X** |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | **X** |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | **X** |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | **X** |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | **X** |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | **X** |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | **X** |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | **X** |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | **X** |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 32 | 32 |
| Final exam and Preparation | 1 | 40 | 40 |
| **Total Workload (Hours)** |  |  | 212 |
| **Total Workload (Hours)/30** |  |  | 7.07 |
| **ECTS Credits of the Course** |  |  | 7 |

**Instructor(s):** Assoc. Prof. Sertaç EROĞLU **Date:** 19.08.2022

**Signature:**

# Course Information Form

**SEMESTER**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315010 | **COURSE NAME** | ULTRASOUND |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
| X | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | General principles of wave propagation. Acoustic empedance. Acoustic and radiation pressure. Reflection, reflection and diffraction of acoustic waves.Crystal oscillators. Ultrasonic receiver and senders. Ultrasound waves in gases, liquids and solids. Application of ultrasound and measurement techniques. | | | | | |
| **COURSE OBJECTIVES** | | | | | | 1. To learn general properties of acoustic waves. 2. To gain the fundamental knowledge about the uses of ultrasonic waves. 3. Tom learn ultrasonic and its technological applications in industry and medicine. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | |  | | | | | |
| **TEXTBOOK** | | | | | | 1. Beyer, R. & Letcher, S.V. (1969), *Physical Ultrasonics,* New York; Acad. Press 2. Blitz, J. (1967); *Fundamentals of Ultrasonics*, New York: Plenum Pub.Co. 3. Mason, W.P. (1992); *Physical Acoustics*, New York: JAI Press. | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | General principles of wave propagation | | | | | | | | | | |
| 2 | Acoustic empedance | | | | | | | | | | |
| 3 | Propagation of acoustic waves | | | | | | | | | | |
| 4 | Reflection of acoustic waves | | | | | | | | | | |
| 5 | Refraction of acoustic waves | | | | | | | | | | |
| 6 | Interference of acoustic waves | | | | | | | | | | |
| 7 | Interference of acoustic waves | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Crystal Vibrators | | | | | | | | | | |
| 10 | Generation of ultrasound | | | | | | | | | | |
| 11 | Detection of ultrasound | | | | | | | | | | |
| 12 | Ultrasound waves in solid media | | | | | | | | | | |
| 13 | Ultrasound waves in liquid and gaseous media | | | | | | | | | | |
| 14 | Ultrasound applications | | | | | | | | | | |
| 15 | Ultrasound measurement techniques | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 20 | 20 |
| Total Workload (Hours) |  |  | 86 |
| Total Workload (Hours)/30 |  |  | 3.8 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Prof.Dr. Gökhan SAVAROĞLU

**Signature**: D**ate:** 19.08.2022

# Course Information Form

**SEMESTER**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315011 | **COURSE NAME** | INTRODUCTION TO SEMICONDUCTORS |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | Atomic structure and atomic bonding, Bond types, Band formation in solids, Solids according to band structures, Semiconductor technology, Element and compound semiconductors, Pure and doped semiconductors, Formation and recombination, Mass-action law, Electrical conductivity and mobility in semiconductors, Fermi energy level in semiconductors, Variation of electrical properties of semiconductors with temperature, Hall effect, Defects in semiconductors, Direct and indirect bandgap semiconductors | | | | | |
| **COURSE OBJECTIVES** | | | | | To understand the basis of semiconductors and its importance in technology. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | 1. To make students comprehend the importance of semiconductors in technological applications. 2. To provide a better understanding of semiconductors in electronics and materials sciences | | | | | |
| **COURSE OUTCOMES** | | | | | 1. Knows the structure and basic concepts of semiconductor materials. 2. Knows the physical properties of semiconductor materials. | | | | | |
| **TEXTBOOK** | | | | | S. Wang, Fundamentals of Semiconductor Theory and Device Physics | | | | | |
| **OTHER REFERENCES** | | | | | 1. John P. McKelvey, Solid State and Semiconductor Physics 2. Jacques I. Pankove, Optical Processes in semiconductors 3. Katıhal Fiziğine Giriş, C. Kittel, 1996 4. Prof. Dr. Kaşif ONARAN, Malzeme Bilimi | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | - | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Atomic structure and atomic bonding |
| 2 | Bond types |
| 3 | Band formation in solids, |
| 4 | Solids according to band structures, Element and compound semiconductors |
| 5 | Semiconductor technology |
| 6 | Element and compound semiconductors |
| 7 | Pure and doped semiconductors |
| 8 | Mid-term exam |
| 9 | Formation and recombination, Mass-action law |
| 10 | Fermi energy level in semiconductors |
| 11 | Electrical conductivity and mobility in semiconductors |
| 12 | Variation of electrical properties of semiconductors with temperature |
| 13 | Hall effect |
| 14 | Defects in semiconductors |
| 15 | Direct and indirect bandgap semiconductors |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 35 | 35 |
| Total Workload (Hours) |  |  | 125 |
| Total Workload (Hours)/30 |  |  | 4.17 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Prof. Dr. Ferhunde ATAY

19.08.2022

# Course Information Form

**SEMESTER**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315012 | **COURSE NAME** | FUNDAMENTALS OF DIGITAL ELECTRONICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Numeral systems, programming in machine language, basics of Boolean algebra, logic gates, advanced logical techniques, and problems. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of the course is to provide an understanding of the fundamentals of digital electronics. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | - | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. Will learn how to simplify logical expressions 2. Will learn to program machine language 3. Ability to identify, formulate and solve problems in the relevant branch 4. Ability to directly relate and apply the acquired knowledge with technology and industry | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | | Howard, M. Berlin (1985). Digital Electronics and experiments , Reston; Reston Publishing company  Glasford , Glenn M. (1988) . Digital Electronic circuits. London; Prentice – Hall International Editions  Boylestad, R. & Nashelsky, L. (1978). Electronic devices and circuit theory. New Jersey, Prentice-Hall Inc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projector and computer | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Numeral systems | | | | | | | | | | |
| 2 | Numeral systems | | | | | | | | | | |
| 3 | Numeral systems | | | | | | | | | | |
| 4 | Basics of Boolean algebra | | | | | | | | | | |
| 5 | Basics of Boolean algebra | | | | | | | | | | |
| 6 | Logical gates | | | | | | | | | | |
| 7 | Logical gates | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Theory of De Morgan | | | | | | | | | | |
| 10 | Theory of De Morgan | | | | | | | | | | |
| 11 | Karnaugh map | | | | | | | | | | |
| 12 | Karnaugh map | | | | | | | | | | |
| 13 | Karnaugh map | | | | | | | | | | |
| 14 | Logical design | | | | | | | | | | |
| 15 | Logical design | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 3 | 36 |
| Homework | 12 | 2 | 24 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 6 | 6 |
| Final exam and Preparation | 1 | 6 | 6 |
| Total Workload (Hours) |  |  | 114 |
| Total Workload (Hours)/30 |  |  | 3.8 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Murat Kellegöz, Ph.D.

19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315013 | **COURSE NAME** | INTRODUCTION TO THE NUCLEAR REACTIONS THEORY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY () ELECTIVE (X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
| X | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | |  | | | | | |
| **COURSE OBJECTIVES** | | | | | | It is aimed to better understand the universe and the nature around us, and to train young physicists with inquiring and scientific critical judgment. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | | To train physicists who have a better understanding of the universe and the nature around us, to give students the ability to reason inquiringly and scientifically. | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Is there Dark Energy, Dark Matter, the Universe? | | | | | | | | | | |
| 2 | Does time have a direction? Is time travel possible? | | | | | | | | | | |
| 3 | Are there parallel universes? | | | | | | | | | | |
| 4 | Are we real? Or is the universe a simulation? | | | | | | | | | | |
| 5 | Why is there antimatter? | | | | | | | | | | |
| 6 | How controversial is the Big-Bang? Alternative models | | | | | | | | | | |
| 7 | Quantum entanglement, ubiquity | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | String theorem | | | | | | | | | | |
| 10 | Is there really an order in the universe? | | | | | | | | | | |
| 11 | Cold fusion dream? Scientific fraud or possible? | | | | | | | | | | |
| 12 | Future sciences and economics | | | | | | | | | | |
| 13 | Science and theology debates | | | | | | | | | | |
| 14 | Physics and genetics | | | | | | | | | | |
| 15 | Are artificial humans and beings possible? | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 4 | 48 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 15 | 15 |
| Total Workload (Hours) |  |  | 120 |
| Total Workload (Hours)/30 |  |  | 4 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Dr. Ali İhsan KILIÇ

07.11.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315006 | **COURSE NAME** | INTRODUCTION TO PHOTONICS |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | TÜRKÇE |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 40 |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | 60 | 100 |
| **PREREQUISITE(S)** | | | | | Review of electromagnetic theory Optical system, gaussian beams, optical resonator Atomic radiation, laser oscillation and amplification  General characteristics of lasers, laser excitation Gas lasers Dye lasers  Atomic lasers Molecular lasers Quantum theory of the lasers Fluorescence excitation spectroscopy | | | | | |
| **COURSE DESCRIPTION** | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application | | | | | |
| **COURSE OBJECTIVES** | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application | | | | | |
| **COURSE OUTCOMES** | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application | | | | | |

|  |  |  |
| --- | --- | --- |
| **TEXTBOOK** | 1.  2.  3.  4. | Optoelektronik, çeviri: İbrahim Okur, Değişim Yayınları, 2000.  Laser Electronics- Joseph T. Verdeyen, Prentice Hall 1989.  Principles of Lasers, Orazio Svelto, Plenum Press, 1989. Lasers Principles and Applications, J. Wilsom, J.F.B. Hawkes, Prentice Hall, 1987. |
|  | 5. | Laser Spectroscopy, Wolfgang Demtröder, Springer, 1996. |
| **OTHER REFERENCES** | 1.  2.  3.  4. | Optoelektronik, çeviri: İbrahim Okur, Değişim Yayınları, 2000.  Laser Electronics- Joseph T. Verdeyen, Prentice Hall 1989.  Principles of Lasers, Orazio Svelto, Plenum Press, 1989. Lasers Principles and Applications, J. Wilsom, J.F.B. Hawkes, Prentice Hall, 1987. |
|  | 5. | Laser Spectroscopy, Wolfgang Demtröder, Springer, 1996. |
| **TOOLS AND EQUIPMENTS REQUIRED** | 1.  2.  3.  4. | Optoelektronik, çeviri: İbrahim Okur, Değişim Yayınları, 2000.  Laser Electronics- Joseph T. Verdeyen, Prentice Hall 1989.  Principles of Lasers, Orazio Svelto, Plenum Press, 1989. Lasers Principles and Applications, J. Wilsom, J.F.B. Hawkes, Prentice Hall, 1987. |
|  | 5. | Laser Spectroscopy, Wolfgang Demtröder, Springer, 1996. |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Review of electromagnetic theory |
| 2 | Optical system, gaussian beams, optical resonator |
| 3 | Atomic radiation, laser oscillation and amplificatio |
| 4 | General characteristics of lasers, laser excitation |
| 5 | General characteristics of lasers, laser excitation |
| 6 | Gas lasers Dye lasers |
| 7 | Gas lasers Dye lasers |
| 8 | Mid-term exam |
| 9 | Atomic lasers Molecular lasers |
| 10 | Quantum theory of the lasers; an introduction Spectroscopy of lasers; an introduction |
| 11 | Quantum theory of the lasers; an introduction Spectroscopy of lasers; an introduction |
| 12 | Fluorescence excitation spectroscopy, laser raman spectroscopy |
| 13 | Laser spectroscopy and surface analysis with microscopy |
| 14 | Laser spectroscopy and surface analysis with microscopy Presented of application |
| 15 | Presented of application |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 148 |
| Total Workload (Hours)/30 |  |  | 4.93 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Prof.Dr.Erol TAŞAL

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315008 | **COURSE NAME** | OPTICAL INSTRUMENTS AND APPLICATIONS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 50 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Presentation | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | To have passed the "Optics and Waves Course" | | | | | |
| **COURSE DESCRIPTION** | | | | | | Reflection, refraction and dispersion of light on plane surfaces, Optical elements: Mirrors, Lenses, Light prism, Diffraction grating, Polarization techniques, Polorimeter and its applications, Light and color filters, Human eye, Microscope, Binoculars, Camera, Telescope and its elements, Fiber optics, Spectrophotometer and its uses | | | | | |
| **COURSE OBJECTIVES** | | | | | | Information about optical instruments and optical devices used in optics science is given. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | 1. Detailed examination of optical instruments and analytical approach, 2. Ability to recognize and use optical instruments, 3. Evaluation of data from optical instruments 4. Being able to relate the acquired knowledge, 5. The ability to directly relate and apply the acquired knowledge with technology and industry. | | | | | |
| **COURSE OUTCOMES** | | | | | | Recognizing optical instruments, gaining the ability to use and evaluating data | | | | | |
| **TEXTBOOK** | | | | | | Ders notları, Optik Aletler;Yrd.Doç.Dr. Şadan Korkmaz Fizik III Optik Deneyleri Laboratuvar Kitapçığı | | | | | |
| **OTHER REFERENCES** | | | | | | Optic- Eugene Hecht | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Optical devices mentioned in the course content | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Reflection, refraction and dispersion of light on plane surfaces | | | | | | | | | | |
| 2 | Optical elements: mirrors | | | | | | | | | | |
| 3 | Optical elements: Lenses | | | | | | | | | | |
| 4 | Optical elements: Light prism | | | | | | | | | | |
| 5 | Optical elements: Diffraction grating | | | | | | | | | | |
| 6 | Polarization techniques and Brewster's angle | | | | | | | | | | |
| 7 | Polyimetry and its applications | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Light and color filters | | | | | | | | | | |
| 10 | Human eye | | | | | | | | | | |
| 11 | Microscope and its elements | | | | | | | | | | |
| 12 | Binoculars, Telescope, Camera and its elements | | | | | | | | | | |
| 13 | Fiber optic | | | | | | | | | | |
| 14 | Spectrophotometer and its uses | | | | | | | | | | |
| 15 | An overview | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 10 | 10 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 144 |
| Total Workload (Hours)/30 |  |  | 4.8 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Doç. Dr. Sadiye ÇETİNKAYA ÇOLAK

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315004 | **COURSE NAME** | INTRODUCTION TO PLASMA PHYSICS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | General information about Plasma, Plasma description, Nature plasmas, Plasma parameters, Plasma classification, The basic processes for the production of lowpressure plasmas, Elastic collisions, Excitation and ionization of atoms and molecules, Photoelectric effect, which is formed with ions in the solid surface of secondary electrons, Thermionic emission, Plasma collective behavior; Thermodynamic equilibrium, The ion and electron mobility, Diffusion of species in plasma, Plasma radiation, The positive column theory | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of the course, Fundamentals of plasma physics and plasma characteristics. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | The Importance of Physics in the field of plasma physics. The Importance of Plasma Applications in industry and technology. | | | | | |
| **COURSE OUTCOMES** | | | | | | Learning the basics of Plasma. Plasma and understanding of plasma properties. Plasmas in Nature. Learning classification of plasma. Learning the basic events of low pressure plasmas. Explain of Nature Event and analyze. Data analyzing, evaluating, designing and conducting experiments. Acquired information directly with the correlation and application of technology and industry | | | | | |
| **TEXTBOOK** | | | | | | Ekem, N. Musa, G., Akan, T (2001), Plazma Fiziği Ders Notları, Eskisehir. | | | | | |
| **OTHER REFERENCES** | | | | | | Roth,A. (1995) , Vacuum Technology, Amsterdam: Elsevier Publishing Company, Lieberman,M. , Lichtenberg,A.L., Principles of Plasma  Discharges And Materials Processing, New York, Wiley-Interscience Publication McDaniekl, E.W. (1964) , Collision Phenomena in Ionized  Gases, WileySons,Inc. Grill,A. (1993), Cold Plasma in Materials Fabrcation, IEEE Press Marr,G.V. (1968) , Plasma Spectroscopy, Elsevier Publishing Company Griem,H.R., Plasma Spectroscopy, McGraw-Hill Company | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Definition of plasma | | | | | | | | | | |
| 2 | Parameters of plasma | | | | | | | | | | |
| 3 | Classification of plasma | | | | | | | | | | |
| 4 | Hot and Cold plasmas | | | | | | | | | | |
| 5 | Hot and Cold plasmas | | | | | | | | | | |
| 6 | Basic Events Occurring in Plasma | | | | | | | | | | |
| 7 | Thermionic Emission and Formation of Secondary Electrons | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Breakdown Voltage and Paschen Curve | | | | | | | | | | |
| 10 | Determination of Breakdown Voltage Experiment | | | | | | | | | | |
| 11 | Determination of Breakdown Voltage Experiment | | | | | | | | | | |
| 12 | Electrical Discharge Types and Features | | | | | | | | | | |
| 13 | Voltage-Current Characteristic for Low Pressure Discharges | | | | | | | | | | |
| 14 | Dark Townsend Discharge | | | | | | | | | | |
| 15 | Glow Discharge,Arc Discharge | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 144 |
| Total Workload (Hours)/30 |  |  | 4.8 |
| ECTS Credits of the Course |  |  | 5 |

|  |  |
| --- | --- |
| **Instructor(s):** Prof. Dr. Suat Pat **Signature**: | **Date:** 19.08.2022 |

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315009 | **COURSE NAME** | INSTRUMENTAL ANALYSIS TECHNIQUES AND DATA ANALYSIS INTERPRETATION |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | |  |  |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | None | | | | | | |
| **COURSE DESCRIPTION** | | | | | | Spectroscopic methods; Ray; Absorption laws; Atomic absorption spectroscopy; UV-Visible spectroscopy, IR, NMR, ESR | | | | | | |
| **COURSE OBJECTIVES** | | | | | | Examination of the Theory and Application Areas of Modern Analytical Methods. The student's ability to propose a method to analyze a sample. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Gaining the ability to make analysis in analyzes where classical methods are not useful. Gaining the ability to optimally use factors such as laboratory facilities, time, desired/required accuracy in deciding which method/methods will be used in an analysis. | | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. Defines Instrumental Analysis methods, explains their importance and categorizes them. 2. Explains, relates and examines the wave and particle character of the ray. 3. Explains the events that may occur as a result of matter-ray interaction. 4. Compare and interpret atomic and molecular absorption spectra. 5. Explains spectroscopic methods, discusses their differences/similarities. 6. Defines atomic absorption spectroscopy, explains its principles, discusses the results and benefits of analysis using AAS. 7. Defines IR spectroscopy, explains its principles and shows its application. 8. Discusses the results and benefits of analysis using NMR. 9. Explains and interprets UV-visible spectroscopy. 10. Explains and interprets EPR spectroscopy. | | | | | | |
| **TEXTBOOK** | | | | | | Gündüz, T., “İnstrumental Analiz”, Gazi Kitabevi, 2002. | | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Erdik, E., “Organik Kimyada Spektroskopik Yöntemler”, Gazi Kitabevi, 1998. 2. Douglas, A., Skoog, F., Holler, J., Nieman, T. A., “Principles of Instrumental Analysis”, Saunders College Publishing, 1998. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | computer, projector | | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Physical properties of matter and radiation; Matter-Ray interaction; Absorption of Beam | | | | | | | | | | | |
| 2 | Absorption Laws; Lambert-Beer Law; Applications | | | | | | | | | | | |
| 3 | Atomic Absorption Spectroscopy, Flame or arc temperature events | | | | | | | | | | | |
| 4 | Energy levels of the atom and the rays it emits | | | | | | | | | | | |
| 5 | Quantum levels and excited atoms | | | | | | | | | | | |
| 6 | Interventions, Assays, Sodium determination | | | | | | | | | | | |
| 7 | UV-VIS (Electronic) Spectroscopy | | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | | |
| 9 | Molecular Orbitals, Transition Energies and Calculation | | | | | | | | | | | |
| 10 | Factors that change electronic transitions; Environmental Impact, Spectrum Disclosure | | | | | | | | | | | |
| 11 | Solvents and sample preparation technique used in IR spectroscopy | | | | | | | | | | | |
| 12 | Structure designation | | | | | | | | | | | |
| 13 | NMR spectroscopy, Quantum law, Relaxation processes | | | | | | | | | | | |
| 14 | Chemical shift, Analytical applications | | | | | | | | | | | |
| 15 | EPR applications | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 5 | 70 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 136 |
| Total Workload (Hours)/30 |  |  | 4.53 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Prof. Dr. Güneş S. KÜRKÇÜOĞLU

**Signature**: **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315007 | **COURSE NAME** | SCIENTIFIC RESEARCH AND ETHICAL PRINCIPLES |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | | - | - |
| Quiz | | | | - | - |
| Homework | | | | 1 | 20 |
| Project | | | | - | - |
| Report | | | | - | - |
| Others (………) | | | | - | - |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | There is no prerequisite or co-requisite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Science, scientific thought and other basic concepts, scientific writing process, Data collection-analysis-interpretation, Finalization of scientific research (Reporting, thesis, oral and poster presentation, article, project preparation), Scientific ethics, scientific research and publication ethics. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To examine the foundations of scientific research and scientific research methods, to teach methodological and ethical principles in scientific research, to teach the process of scientific research, evaluation of research results, and reporting of results. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Applies research methods and ethical rules in professional matters. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. To have the understanding of scientific and professional ethics and to gain the ability to defend this understanding in any environment. 2. To have the qualification of a researcher with the awareness of professional responsibility. 3. Gaining the skills of analyzing and reporting the data obtained in scientific researches. 4. To raise awareness about basic research methods and ethical principles. | | | | | |
| **TEXTBOOK** | | | | | | Day, Robert A. (Çeviri: G. Aşkay Altay). (1996). Bilimsel Makale Nasıl Yazılır ve Nasıl Yayımlanır? TÜBİTAK Yayınları, Ankara. | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., Demirel,  F. (2012). Bilimsel Araştırma Yöntemleri. Pegem Akademi Yayınevi, Ankara.   1. Tanrıöğen, A. (Editör). (2014). Bilimsel Araştırma Yöntemleri. Anı Yayıncılık, Ankara. 2. Türkiye Bilimler Akademisi Bilim Etiği Komitesi. Bilimsel Araştırmada Etik ve Sorunları, Ankara: TÜBA Yayınları, (2002). 3. Ekiz, D. (2009). Bilimsel Araştırma Yöntemleri: Yaklaşım, Yöntem ve Teknikler. Anı Yayıncılık, Ankara. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Science and Scientific writing: Basic concepts | | | | | | | | | | |
| 2 | What is scientific publication? | | | | | | | | | | |
| 3 | Scientific publication research methods | | | | | | | | | | |
| 4 | Scientific publication search, database usage (literature search) | | | | | | | | | | |
| 5 | Preparing the title, abstract, introduction and method sections | | | | | | | | | | |
| 6 | Writing the Results section | | | | | | | | | | |
| 7 | Selection, writing and formatting of related citations and references | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Preparation of figures and tables | | | | | | | | | | |
| 10 | Scientific publication publishing processes | | | | | | | | | | |
| 11 | Oral and poster presentation preparation processes | | | | | | | | | | |
| 12 | Presentation preparation processes | | | | | | | | | | |
| 13 | Thesis writing | | | | | | | | | | |
| 14 | Ethics, rights and permissions | | | | | | | | | | |
| 15 | Examination of case studies | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  |  | X |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework | 1 | 20 | 20 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 154 |
| Total Workload (Hours)/30 |  |  | 5.13 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Assoc. Prof. Dr. Gökhan KILIÇ

**Signature**:

**Date:**19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821315005 | **COURSE NAME** | BIOPHYSICS I |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 5 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | There is no prerequisite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Examination of biological systems at the levels of biomolecules, organelles, cells, tissues and systems and the physical interactions associated with these levels. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To examine and understand biological systems and some events taking place in these systems using physical concepts. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Gains basic information about cell biology and molecular biology, interprets biological events from a physical point of view. | | | | | |
| **COURSE OUTCOMES** | | | | | | The student who successfully completes this course;   1. Knows the basic concepts of cell biology and molecular biology. 2. Interpret the physiological processes of the body from a physical point of view. 3. Relate the physics knowledge practically. | | | | | |
| **TEXTBOOK** | | | | | | Prof.Dr. Ferit Pehlivan, Biyofizik, Hacettepe-Taş, Ankara, 2005. | | | | | |
| **OTHER REFERENCES** | | | | | | Berg, H. C. (1993). Random Walks in Biology. New Jersey: Princeton University Pres.  Boal, D. (2002). Mechanics of the Cell. New York: Cambridge Pres. Gürbüz Çelebi. (1995). Biyomedikal Fizik. İzmir: Barış Yayınları. Arberts B., et.al. (2002). Molecular Biology of the Cell. Garland Science. de Gennes, P-G. (1979). Scaling Concepts in Polymer Physics. Ithaca: Cornell University Press.  Doi, E., Edwards, S. F. (1999). The Theory of Polymer Dynamics.  Oxford: Oxford University. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | There is no tools and equipment required for this course. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Introduction to biophysics: Biological systems, classifications, cells and organelles | | | | | | | | | | |
| 2 | Examination of biological systems at tissue and organ level | | | | | | | | | | |
| 3 | Examination of biological systems at the system level | | | | | | | | | | |
| 4 | Cell biology; organelles, biomolecules | | | | | | | | | | |
| 5 | Examination of effective physical scales in the cell; associated dimensions, force, time and energy | | | | | | | | | | |
| 6 | Chemical balance in the cell | | | | | | | | | | |
| 7 | Introduction to cell-related statistical physical concepts; heat, temperature, distribution function, Boltzmann distribution | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Statistical physical concepts related to the cell; fluctuations and entropy | | | | | | | | | | |
| 10 | Gene synthesis and genetic code in the cell | | | | | | | | | | |
| 11 | DNA and RNA structure and properties | | | | | | | | | | |
| 12 | Structure and properties of proteins | | | | | | | | | | |
| 13 | Intermolecular interactions and shielding | | | | | | | | | | |
| 14 | Movement in the molecular world (diffusion, dispersion) | | | | | | | | | | |
| 15 | Motion in the molecular world (random motion, friction) | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws, and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 25 | 25 |
| **Total Workload (Hours)** |  |  | 138 |
| **Total Workload (Hours)/30** |  |  | 4.6 |
| **ECTS Credits of the Course** |  |  | 5 |

**Instructor(s):** Assoc. Prof. Sertaç EROĞLU **Date:** 19.08.2022

**Signature:**

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316002 | **COURSE NAME** | NUCLEUS PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 4 | | 0 | 0 | | 4 | 7 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with(****) ]** | | | | | **Social Science** |
| X | | |  | | |  | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 50 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREEQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Atomic nucleus and its properties  Nucleon-nucleon interactions  Properties of the nuclear force  Nuclear models  Radioactive decay  Alpha, Beta, and Gamma decays | | | | | |
| **COURSE OBJECTIVES** | | | | | | Study the structure and properties of the atomic nucleus theoretically and compare them with experimental results | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | We aimed at introducing students to professions which are directly related to the nuclear physics by giving details of application areas of nuclear physics and organizing seminars in this area. | | | | | |
| **COURSE OUTCOMES** | | | | | | Understand properties of the nuclear force and applications of nuclear physics to other areas of research and technology | | | | | |
| **TEXTBOOK** | | | | | | “Nuclear Physics I and II” K. S. Krane, 1988, John Wiley & Sons, Inc. | | | | | |
| **OTHER REFERENCES** | | | | | | “Çekirdek Fiziğine Giriş” W.N. Cottingham-D.A. Greenwood Çeviri: İ. Açıkgöz, S. Yıldırım, 2001.  “Nükleer Fizik” B. Tanyel, Ege Üniversitesi Basımevi, 1994.  “Nükleer Fizik Problemleri” Ş. Özkök, Çağlayan Kitabevi, İstanbul **“Nuclear and Particle Physics” W.S.C.Williams, Oxford Science Publications, 1991.** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Nuclear Physics Research Lab. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Atomic models, basic concepts in nuclear physics, units and dimensions | | | | | | | | | | |
| 2 | Quantum statistics, fermions, bosons, angular momentum, and parity | | | | | | | | | | |
| 3 | Nuclear properties I: nuclear radius, mass, nuclear binding energy in ground state | | | | | | | | | | |
| 4 | Nuclear properties II: semi empirical mass formula, nuclear electromagnetic moments | | | | | | | | | | |
| 5 | The force between the nucleons, deuteron | | | | | | | | | | |
| 6 | The properties of the nuclear force, the exchange force model | | | | | | | | | | |
| 7 | The shell model of the nucleus | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Collective models: nuclear vibrations, nuclear rotations | | | | | | | | | | |
| 10 | Radioactive decay I: the radioactive decay law, half-life, mean lifetime | | | | | | | | | | |
| 11 | Radioactive decay II: natural radioactivity, radioactive series | | | | | | | | | | |
| 12 | Radioactive decay III: radioactive dating, units of measuring radiation | | | | | | | | | | |
| 13 | Interactions of radiation with matter | | | | | | | | | | |
| 14 | Measuring nuclear radiation | | | | | | | | | | |
| 15 | Alpha, Beta, and Gamma decays | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 5 | 70 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 30 | 30 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 206 |
| Total Workload (Hours)/30 |  |  | 6.86 |
| ECTS Credits of the Course |  |  | 7 |

**Instructor(s):** Celal AŞICI, Ph.D.

**Signature**:  **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316001 | **COURSE NAME** | QUANTUM PHYSICS II |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | | **COURSE OF** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | 4 | | 0 | 0 | | | 4 | 7 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | |  | | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | | |  |  |
| Quiz | | | | |  |  |
| Homework | | | | |  |  |
| Project | | | | |  |  |
| Report | | | | |  |  |
| Others (………) | | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | There is no prerequisite for this course. | | | | | | |
| **COURSE DESCRIPTION** | | | | | Applications of the Schrödinger equation in three dimensions, angular momentum and spin, approximate methods and perturbation theory, symmetry and transformations, systems of identical particles. | | | | | | |
| **COURSE OBJECTIVES** | | | | | To introduce the principles and the general formalism of quantum mechanics, and to make their applications. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Students will learn the concepts of modern physics in investigation of natural phenomena. Meanwhile, students will do solutions for these phenomena by means of the quantum mechanical point of view. Applying the quantum mechanical equations of motion in the identical particle systems of micro universe, students will understand its importance in daily life applications such as electronics, semiconductor technology. | | | | | | |
| **COURSE OUTCOMES** | | | | | 1. Understand the fundamental principles and concepts of quantum physics. 2. Knowledge of studying identical particle systems 3. Understand natural phenomena by the quantum mechanical point of view. 4. Apply knowledge of natural sciences (Physics, Chemistry, Mathematics). 5. Justify and analyze natural phenomena. 6. Identify, formulate, and solve field related problems. 7. Interdisciplinary knowledge association and application. 8. Direct correlation and application of gained knowledge with technology and industry. 9. Get an understanding of professional and ethical responsibility. 10. Get a recognition of the need for, and an ability to engage in life-long learning. 11. Gain a knowledge of contemporary issues. | | | | | | |
| **TEXTBOOK** | | | | | Karaoğlu, B., “Kuantum mekaniğine giriş”, Seçkin Yayıncılık, Ankara, 2008. | | | | | | |
| **OTHER REFERENCES** | | | | | 1. Griffiths, D. J., Çeviri: Özbek, H., Feyiz, S. D., “Kuantum Mekaniğine Giriş”, Nobel Yayıncılık, Ankara, 2010. 2. Gasiorowicz, S., “Quantum physics (3rd edition)”, John Wiley & Sons, New Jersey, 2003. | | | | | | |

|  |  |
| --- | --- |
|  | 1. Aygün, E., Zengin D. M., “Kuantum Fiziği”, Bilim Yayınevi, Ankara, 1992. 2. Erbil, H., “Kuantum Fiziği-I”, Ege Üniversitesi Basımevi, İzmir, 2001. 3. Budak, G., Karabulut A., “Kuantum Fiziği I”, Nobel Yayıncılık, Ankara, 2007. 4. Liboff, R. L., “Kuantum mekaniğine giriş”, Addison-Wesley Publishing Company, New York, 1988. 5. Landau, L.D., Lifshitz, E. M., Çeviri: Zengin, M. Selam, C. Korcak, S., “Kuantum Mekaniği”, Bilim Yayınları, Ankara, 2000. 6. Zettili, N., “Quantum mechanics”, John Wiley &Sons, New York, 2001. |
| **TOOLS AND EQUIPMENTS REQUIRED** | There is no tools and equipment required for this course. |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Spherically symmetric potential |
| 2 | Hydrogen atom and the solutions of its Schrödinger equation I |
| 3 | Hydrogen atom and the solutions of its Schrödinger equation II |
| 4 | Angular momentum algebra |
| 5 | Spin, and applications with spin wave functions |
| 6 | Perturbation expansion I |
| 7 | Perturbation expansion II |
| 8 | Mid-term exam |
| 9 | Variational method |
| 10 | Symmetry and symmetry operations |
| 11 | Unitary transformations |
| 12 | Symmetry and conservation laws |
| 13 | Identical particle systems and their properties |
| 14 | Problem of the helium atom |
| 15 | Systems with *N*-particles, and their applications |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws, and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 32 | 32 |
| Final exam and Preparation | 1 | 40 | 40 |
| **Total Workload (Hours)** |  |  | 212 |
| **Total Workload (Hours)/30** |  |  | 7.07 |
| **ECTS Credits of the Course** |  |  | 7 |

**Instructor(s):** Assoc. Prof. Sertaç EROĞLU **Date:** 19.08.2022

**Signature:**

# ESOGÜ Physics Department Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316003 | **COURSE NAME** | THERMODYNAMICS AND STATISTICAL PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 4 | | 0 | 0 | | 4 | 7 | COMPULSORY (X) ELECTIVE ( ) | |  |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Introduction to Thermodynamics; System and Environment Concepts; Temperature, Heat, Energy Concepts and Measurements; Ideal Gas Concept and Thermodynamic Parameters; Laws of Thermodynamics; Internal Energy; enthalpy; Entropy; Statistical Clusters; Introduction to  Statistical Physics; Microstates, Macrostates and Probability Operations; Binomial, Gaussian, Poisson Distribution Functions; Canonical Set;  Statistical Analysis of Ideal and Non-Ideal Gases; Quantum Statistics Physics; Grand Canonical Set; Maxwell Boltzman , Bose-Einstein and  Fermi-Dirac Statistics and Distribution Functions | | | | | |
| **COURSE OBJECTIVES** | | | | | | To draw conclusions from the number of microscopic states to thermodynamic and statistical operations in macroscopic events occurring in nature. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Making sense of thermal and statistical events in the universe through the world of microstates | | | | | |
| **COURSE OUTCOMES** | | | | | | To be able to apply the number of thermal and statistical microstates for different systems and different particle types | | | | | |
| **TEXTBOOK** | | | | | | Termodinamik, Y.A. Çengel ve Michael Boles  İstatistik Fizik, Berkeley Fizik Dersleri, Cilt 5, F. Reif. | | | | | |
| **OTHER REFERENCES** | | | | | | Isı, Termodinamik ve İstatistik Fizik, Fevzi Köksal, [Rahmi Köseoğlu](https://www.amazon.com.tr/s/ref=dp_byline_sr_book_1?ie=UTF8&field-author=Rahmi+K%C3%B6seo%C4%9Flu&search-alias=books) | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | System and Environment Concepts | | | | | | | | | | |
| 2 | Temperature, heat and heat transfer mechanisms | | | | | | | | | | |
| 3 | Thermodynamics of gases | | | | | | | | | | |
| 4 | Ideal Gas Concept and Thermodynamic Parameters | | | | | | | | | | |
| 5 | Thermodynamic processes | | | | | | | | | | |
| 6 | Classical statistical physics | | | | | | | | | | |
| 7 | Microstates, Macrostates and Probability Operations | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Canonical and Microcanonical Set | | | | | | | | | | |
| 10 | Statistical Physics of Gases, Maxwell Boltzman Distribution | | | | | | | | | | |
| 11 | Quantum Statistics Physics | | | | | | | | | | |
| 12 | Grand Canonical Ensemble | | | | | | | | | | |
| 13 | The Bose-Einstein Distribution | | | | | | | | | | |
| 14 | The Fermi-Dirac Distribution | | | | | | | | | | |
| 15 | Fermi and Bose Gas | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 40 | 40 |
| Total Workload (Hours) |  |  | 200 |
| Total Workload (Hours)/30 |  |  | 6.67 |
| ECTS Credits of the Course |  |  | 7 |

**Instructor(s):** Doç. Dr. Salih KÖSE

**Signature**: **Date:** 19.08.2022

# ESOGÜ Physics Department Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316013 | **COURSE NAME** | SENSORS AND TRANSDUCERS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY ( ) ELECTIVE (X) | | TURKISH |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 20 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | | 1 | 10 |
| Homework | | | | 2 | 10 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (Sunum) | | | | 1 | 10 |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Principles and characteristics of sensors and transducers. Biosensors, temperature, pressure, strain sensors, magnetic sensors, optic sensors, chemical sensors. Type of transducers, capacitive transducers, piezoelectric transducers, electromagnetic transducers, optic transducers. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To understand working principles and physical bases of sensors and transducers and to learn basic knowledge about their technological applications. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | 1. To comprehend and identify sensor and transducer technologies, 2. To identify, formulate and overcome skills of problems related to sensors and transducer, 3. To be able to explain and analyze natural events, 4. To be able to associate earned knowledge, 5. To be able to associate earned knowledge with technology and application skill. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. To describe advanced Physical concepts and improve application skill 2. Application ability of Physics principles on real life 3. Ability to reach scientific knowledge 4. Integrated technological applications with Physics principles | | | | | |
| **TEXTBOOK** | | | | | | * Ian Sinclair, Sensors and Transducers, 3rd Ed. 2001 Elsevier. * Akın KAHRAMAN vd. Endüstriyel Otomasyon Teknolojileri alanı, Sensörler, Milli Eğitim Bakanlığı. | | | | | |
| **OTHER REFERENCES** | | | | | | -MIT OpenCoursware " Sensor Technologies for Interactive Environment"   * J. Hesse, J. W. Gardner, W. Göpel, Sensors in Household Appliance, WILEY- VCH, 2003. * J. W. Gardner, Microsensor, principles and Applications, * Loick J. Blum, Pierre R. Coulet, Biosensors principles and Applications * Dilşad Engin, Sensörler ve dönüştürücüler, 2014 Ege Üniversitesi | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projector and Computer | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | The concept of sensor and transducer | | | | | | | | | | |
| 2 | Structure and types of sensors and transducers | | | | | | | | | | |
| 3 | Characteristics of sensors: transfer function, linearity, sensitivity, repeatability, calibration | | | | | | | | | | |
| 4 | Physical characteristics of sensing | | | | | | | | | | |
| 5 | Temperature sensors | | | | | | | | | | |
| 6 | Magnetic sensors | | | | | | | | | | |
| 7 | Optic sensors | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Exam critics | | | | | | | | | | |
| 10 | Pressure and strain sensors | | | | | | | | | | |
| 11 | Chemical sensors and biosensors | | | | | | | | | | |
| 12 | Liquid and gas sensors | | | | | | | | | | |
| 13 | Motion sensors | | | | | | | | | | |
| 14 | Multi sensor applications – Sensor networks | | | | | | | | | | |
| 15 | Renovation of sensors and occupational health safety effect | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  | X |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 15 | 2 | 30 |
| Out of Class Study Time (Pre-study, Reinforcement) | 15 | 3 | 45 |
| Homework | 2 | 5 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 10 | 10 |
| Quiz and preparation (Quiz) | 1 | 10 | 10 |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 10 | 10 |
| Total Workload (Hours) |  |  | 125 |
| Total Workload (Hours)/30 |  |  | 4.17 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Assoc. Prof. Malik KAYA

**Signature**:  **Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316011 | **COURSE NAME** | APPLIED ELECTROMAGNETICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY ( ) ELECTIVE ( X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Fundamentals of Electromagnetic Field, Static Electric Fields, Static Magnetic Fields, Maxwell's Equations in Time Varying Fields, Propagation of Plane Waves, Wave Reflection and Transmission, Waveguides | | | | | |
| **COURSE OBJECTIVES** | | | | | | To enable students to understand the basic concepts of electromagnetic waves and the properties of the medium in which they propagate, and to develop their problem-solving skills. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | In practice, to solve various problems of physical systems within the limits of classical physics by using different methods and to improve their application skills in daily life. | | | | | |
| **COURSE OUTCOMES** | | | | | | Learning to use different methods to solve various physical problems | | | | | |
| **TEXTBOOK** | | | | | | Fundamentals of Applied Electromagnetics, Fawwaz T. Ulaby, Eric Michielssen and Umberto Ravaioli, Pearson Education, 2015. | | | | | |
| **OTHER REFERENCES** | | | | | | [Elektromanyetik Alanlar,](https://avesis.akdeniz.edu.tr/yayin/1dee3bc2-24cd-465a-a6b1-2dade6a657f6/elektromanyetik-alanlar) Özen Ş., Arı N., Palme Yayıncılık, 2008. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and Projector | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Fundamentals of the Electromagnetic Field | | | | | | | | | | |
| 2 | Historical Development of Electromagnetism | | | | | | | | | | |
| 3 | The Nature of Electromagnetism | | | | | | | | | | |
| 4 | Vector Analysis | | | | | | | | | | |
| 5 | Charge and Current Distributions | | | | | | | | | | |
| 6 | Conductors, Dielectrics, Electrical Boundary Conditions | | | | | | | | | | |
| 7 | Capacitors, Electrostatic Potential Energy, Supercapacitors as Batteries, Sensors | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Magnetic Forces and Torques | | | | | | | | | | |
| 10 | Magnetic Properties of Materials, Magnetic Boundary Conditions, Magnetic Energy | | | | | | | | | | |
| 11 | Maxwell Equations for Time Varying Fields | | | | | | | | | | |
| 12 | Ideal Transformer, Electromagnetic Generator | | | | | | | | | | |
| 13 | Plane Wave Propagation, Different Types Polarization of Waves | | | | | | | | | | |
| 14 | Reflection and Transmission of Waves at Different Arrival States, Snell's Law | | | | | | | | | | |
| 15 | Waveguides | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 130 |
| Total Workload (Hours)/30 |  |  | 4,33 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Dr.Öğr.Üyesi Ali ÇETİN

**Signature**:  **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316012 | **COURSE NAME** | INTRODUCTION TO HYDROGEN ENERGY |

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAG**  **E** |
| 6 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 10 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (Pesentation) | | | | 1 | 10 |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | What is Energy and Technology?; Energy use from past to present, view of exhaustible and inexhaustible energy resources; What is hydrogen?, Hydrogen sources, production, storage, transportation, environmental effects, safety, usage areas; The situation in the world and in Turkey and the International Hydrogen Energy Technologies Center (ICHET). | | | | | |
| **COURSE OBJECTIVES** | | | | | | Getting to know energy and technology. To comprehend energy use and types of energy from past to present. To introduce the energy and technology of hydrogen by covering the properties, production and storage, safety and transportation, usage area and environmental impact of hydrogen. To comprehend the situation of hydrogen in the world and in Turkey and the International Hydrogen Energy Technologies Center located in Istanbul. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To establish a scientific basis in the field of hydrogen energy and technologies. | | | | | |
| **COURSE OUTCOMES** | | | | | | Getting to know hydrogen energy and technologies  Understanding the properties of hydrogen and the situation in the world | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | | * Prof.Dr.Durmuş KAYA, Prof.Dr.H.Hüseyin ÖZTÜRK,   Doç.Dr.Muhammet KAYFECİ. (2017). Hidrojen ve Yakıt Pili Teknolojisi.  Umuttepe Yayınları.   * Hülya Erdener, Serdar Erkan, Ela Eroğlu, Nadiye Gür, Erce Şengül,   Nurcan Baç. (2007). Sürdürülebilir Enerji ve Hidrojen. ODTU Yayıncılık.   * Yrd.Doç.Dr.İsmet AKOVA. (2008). Yenilenebilir Enerji Kaynakları.   Nobel Yayın Dağıtım. \* Prof.Dr.Beycan İbrahimoğlu. (2008). Hidrojenli Enerji Üreteçleri. Nobel Yayın Dağıtım. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projector and computer | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | What is Energy and Technology? | | | | | | | | | | |
| 2 | Energy use from past to present. | | | | | | | | | | |
| 3 | Overview of inexhaustible and inexhaustible energy sources. | | | | | | | | | | |
| 4 | Overview of inexhaustible and inexhaustible energy sources. (continue) | | | | | | | | | | |
| 5 | What is hydrogen? | | | | | | | | | | |
| 6 | Hydrogen sources. | | | | | | | | | | |
| 7 | Hydrogen production. | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Hydrogen storage. | | | | | | | | | | |
| 10 | Hydrogen storage. | | | | | | | | | | |
| 11 | Hydrogen transport. | | | | | | | | | | |
| 12 | Environmental effects of hydrogen. | | | | | | | | | | |
| 13 | Hydrogen environmental effects. | | | | | | | | | | |
| 14 | Hydrogen safety. | | | | | | | | | | |
| 15 | The situation of hydrogen in the world and in Turkey-International Hydrogen Energy Technologies Center. | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and teamwork. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 3 | 36 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 10 | 10 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 12 | 10 |
| Final exam and Preparation | 1 | 12 | 10 |
| Total Workload (Hours) |  |  | 118 |
| Total Workload (Hours)/30 |  |  | 3.9 |
| ECTS Credits of the Course |  |  | 4 |

**Dersin Öğretim Üyesi:** Murat KELLEGÖZ, Ph.D.

**İmza**:  **Tarih:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316010 | **COURSE NAME** | INTRODUCTION TO LASER PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY ( ) ELECTIVE ( X ) | | TÜRKÇE |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Electromagnetic theory. Optical system, gaussian beam, optical resonator. Atomic radiation, laser vibrations. General characteristics of lasers, laser excitations. General characteristics of lasers, laser excitations. Gas lasers, dye lasers. Gas lasers, dye lasers. Atomic lasers, molecule lasers. Gas lasers Dye lasers. Atomic lasers, Molecular lasers, Atomic lasers, Molecular lasers. Explaining laser application homework in class | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data,  Interdisciplinary knowledge association and application | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | - | | | | | |
| **COURSE OUTCOMES** | | | | | | - | | | | | |
| **TEXTBOOK** | | | | | | Optoelektronik, çeviri: İbrahim Okur, Değişim Yayınları, 2000. Laser Electronics- Joseph T. Verdeyen, Prentice Hall 1989.  Principles of Lasers, Orazio Svelto, Plenum Press, 1989.  Lasers Principles and Applications, J. Wilsom, J.F.B. Hawkes, Prentice Hall, 1987.  Laser Spectroscopy, Wolfgang Demtröder, Springer, 1996. | | | | | |
| **OTHER REFERENCES** | | | | | | - | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Review of electromagnetic theory | | | | | | | | | | |
| 2 | Optical system, gaussian beams, optical resonator | | | | | | | | | | |
| 3 | Atomic radiation, laser oscillation and amplificatio | | | | | | | | | | |
| 4 | General characteristics of lasers, laser excitation | | | | | | | | | | |
| 5 | General characteristics of lasers, laser excitation | | | | | | | | | | |
| 6 | Gas lasers Dye lasers | | | | | | | | | | |
| 7 | Gas lasers Dye lasers | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Atomic lasers Molecular lasers | | | | | | | | | | |
| 10 | Atomic lasers Molecular lasers | | | | | | | | | | |
| 11 | Atomic lasers Molecular lasers | | | | | | | | | | |
| 12 | Atomic lasers Molecular lasers | | | | | | | | | | |
| 13 | Atomic lasers Molecular lasers | | | | | | | | | | |
| 14 | Atomic lasers Molecular lasers | | | | | | | | | | |
| 15 | Presented of application | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 2 | 28 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 120 |
| Total Workload (Hours)/30 |  |  | 4 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Prof. Dr. Erol TAŞAL

**Signature**: **Date:** 19.08.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316014 | **COURSE NAME** | INTRODUCTION TO THE NUCLEAR REACTIONS THEORY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 4 | COMPULSORY () ELECTIVE (X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
| X | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Fundamental Nuclear Physics, Nuclear Scattering, elastic and inelastic scattering, cross section, Nuclear Optical model, polarized and unpolarized cross section, Few-body nucleon system, single resonance, direct reactions, DWBA theory, ADWA theory, compound nuclear structure, R- matrix method, heavy ion reactions. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Experimentally and theoretically, it is aimed to understand the mechanisms and investigation methods of nuclear reactions, and to examine their applications in technological and scientific fields. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | | To provide information about current research topics in science and technology of nuclear reaction studies. Developing the ability to study and publish the acquired knowledge. | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Fundamental Nuclear Physics | | | | | | | | | | |
| 2 | Nuclear Scattering | | | | | | | | | | |
| 3 | Elastic and inelastic scattering | | | | | | | | | | |
| 4 | Cross-section | | | | | | | | | | |
| 5 | Nuclear Optical model | | | | | | | | | | |
| 6 | Polarized and non-polarized cross section | | | | | | | | | | |
| 7 | Few-body nucleon system | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Single Resonance | | | | | | | | | | |
| 10 | Direct reactions | | | | | | | | | | |
| 11 | DWBA theory | | | | | | | | | | |
| 12 | ADWA theory | | | | | | | | | | |
| 13 | Compound nuclear structure | | | | | | | | | | |
| 14 | R-matrix method | | | | | | | | | | |
| 15 | Heavy-ion reactions | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 4 | 48 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 15 | 15 |
| Total Workload (Hours) |  |  | 120 |
| Total Workload (Hours)/30 |  |  | 4 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Dr. Ali İhsan KILIÇ

**Signature**: 07.11.2022

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316009 | **COURSE NAME** | FUNDAMENTALS OF SPECTROSCOPY AND GROUP THEORY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | written | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | none | | | | | |
| **COURSE DESCRIPTION** | | | | | | Polarization Properties of Light  Basic concepts  Molecular Rotation Energy Transitions  Infrared Spectroscopy  Raman Spectroscopy  Electronic Spectroscopy of Atoms  Electronic Spectroscopy of Diatomaceous Molecules lasers | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main aim of this course is to briefly introduce the branches of molecular spectroscopy and group theory. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | It is an introduction to researchers who want to do research on a branch of spectroscopy. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. Learns the basic principles of spectroscopy. 2. Learns the theoretical knowledge to interpret the spectrum. 3. Learns to obtain and interpret spectrum. 4. Will be able to make a connection between the spectroscopic method and the electromagnetic spectrum region. 5. Learns the discipline of work in the research laboratory. | | | | | |
| **TEXTBOOK** | | | | | | Şenay Yurdakul, Spektroskopi ve Grup Teorisinin Temelleri, Gazi Yayınevi,2010 | | | | | |
| **OTHER REFERENCES** | | | | | | Raymond Chang, Basic Principles of Spectroscopy, McGraw-Hill Kogakusha, Ltd. 1971. Collin N. Banwell, Elaine M. McCash, fundamentals of moleculer Spectroscopy, McGrew-Hill Book Company, 1994. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | computer, projector | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Polarization Properties of Light | | | | | | | | | | |
| 2 | Basic concepts | | | | | | | | | | |
| 3 | Molecular Rotation Energy Transitions | | | | | | | | | | |
| 4 | Infrared Spectroscopy | | | | | | | | | | |
| 5 | Raman Spectroscopy | | | | | | | | | | |
| 6 | Electronic Spectroscopy of Atoms | | | | | | | | | | |
| 7 | Electronic Spectroscopy of Diatomaceous Molecules | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | lasers | | | | | | | | | | |
| 10 | Photoluminescence: Fluorescence and Phosphorescence | | | | | | | | | | |
| 11 | Electron Spin Resonance Spectroscopy (ESR) | | | | | | | | | | |
| 12 | Nuclear Magnetic Resonance Spectroscopy (NMR) | | | | | | | | | | |
| 13 | Molecular Symmetry | | | | | | | | | | |
| 14 | Finding the Point Group of Molecules | | | | | | | | | | |
| 15 | Calculation of Vibration Modes of Some Molecules | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

contr

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Numbers** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 24 | 24 |
| Total Workload (Hours) |  |  | 142 |
| Total Workload (Hours)/30 |  |  | 4,73 |
| ECTS Credits of the Course |  |  | 4 |

**Instructor(s):** Prof. Dr. Güneş S. KÜRKÇÜOĞLU

**Signature**: 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316008 | **COURSE NAME** | APPLIED CLASSIC MECHANICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE (X) | | TURKISH |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Force fields in the universe, Gauss's Law in the gravitational force field, moving coordinate systems, classification of mechanical systems, virtual work, d'alambert theorem, Lagrange and Hamilton equations | | | | | |
| **COURSE OBJECTIVES** | | | | | | To enable students to understand conceptual phenomena related to advanced mechanics and to improve their problem solving skills. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | In practice, to solve various problems of physical systems within the limits of classical physics by using different methods and to improve their application skills in daily life. | | | | | |
| **COURSE OUTCOMES** | | | | | | Learning to use different methods to solve various physical problems | | | | | |
| **TEXTBOOK** | | | | | | Klasik Mekanik, Emine Rızaoğlu, Naci Sünel, okutman yayıncılık, 2008, Mekanik , D.Mehmet Zengin, Cevat Selam, Sabit Koçak, Bilim yayıncılık, 1999  Klasik Mekanik, T.W. Kibble and F.H. Berkshire, Çvr: Kemal Çolakoğlu, Palme yaıncılık, 1999 | | | | | |
| **OTHER REFERENCES** | | | | | | Classical Mechanics, Herbert Goldstein, Addison Wesley | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and Projector | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Motion in a Central Forced Field | | | | | | | | | | |
| 2 | Classification of Orbits in a Central Forced Field | | | | | | | | | | |
| 3 | Differential Equation for Orbits, Keppler Problem | | | | | | | | | | |
| 4 | Scattering in the Centripetal Force Field | | | | | | | | | | |
| 5 | Oscillations | | | | | | | | | | |
| 6 | Small Oscillations | | | | | | | | | | |
| 7 | Applications for Small Oscillations | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Motions of Objects to Accelerated Reference Systems | | | | | | | | | | |
| 10 | Statics and Dynamics of a Rigid Body | | | | | | | | | | |
| 11 | Euler Angles | | | | | | | | | | |
| 12 | Euler Equation of Motions of a Solid Body | | | | | | | | | | |
| 13 | Rigid Body Equations of Motion, Canonical Transformations | | | | | | | | | | |
| 14 | Hamilton-Jacobi Theory | | | | | | | | | | |
| 15 | Special Relativity in Classical Mechanics | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 20 | 20 |
| Total Workload (Hours) |  |  | 142 |
| Total Workload (Hours)/30 |  |  | 4.73 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Dr.Öğr.Üyesi Tevfik ÜNALDI

**Signature**: 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316006 | **COURSE NAME** | SEMICONDUCTOR APPLICATIONS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | | 2 | 20 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Work function, Metal semiconductor contacts, pn junction, Ideal diode,  Junction Transistors, Field effect transistors, MOS transistors,  Determination of the forbidden energy gap of semiconductors, Detection of defects in semiconductors, Photovoltaic solar cells, Dye sensitized solar cells | | | | | |
| **COURSE OBJECTIVES** | | | | | | To teach the technological applications and optical characterization of semiconductors. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To gain experience on electronic applications and optical characterization of semiconductor materials used in technological applications. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. Knows semiconductor technology. 2. Knows the importance of semiconductors that can be used in technological applications. 3. Knows to examine the optical properties of semiconductors. | | | | | |
| **TEXTBOOK** | | | | | | Aydoğan, Ş., Katıhal Elektroniği, 2015, 1. Basım, Nobel Akademik Yayıncılık Eğitim Danışmanlık Tic. Ltd. Şti, 236 s. | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Owen, T., 2000, Fundamentals of modern UV-visible spectroscopy, Copyright Agilent Technologies, Printed in Germany 06/00, Publication number 5980-1397E. 2. Ohring, M., 1992, The Materials Science of Thin Films, Academic Press San Diego New York Boston London Sydney Tokyo Toronto, p 147-193. 3. Fox, M., 2001, Optical properties of solids, Oxford University Press, New York, ,262 p. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Work function, Metal semiconductor contacts | | | | | | | | | | |
| 2 | pn junction, Ideal diode | | | | | | | | | | |
| 3 | Rectifier diodes, Zener Diodes, Schottky diodes | | | | | | | | | | |
| 4 | Varicap diode, Tunnel diode, Photodiode, Light emitting diode | | | | | | | | | | |
| 5 | Junction Transistors | | | | | | | | | | |
| 6 | Field effect transistors (JFET) | | | | | | | | | | |
| 7 | Metal oxide semiconductor FET (MOSFET) | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Determination of the forbidden energy gap of semiconductors | | | | | | | | | | |
| 10 | Determination of the forbidden energy gap of semiconductors | | | | | | | | | | |
| 11 | Detection of defects in semiconductors | | | | | | | | | | |
| 12 | Detection of defects in semiconductors | | | | | | | | | | |
| 13 | Photovoltaic solar cells | | | | | | | | | | |
| 14 | Dye sensitized solar cells | | | | | | | | | | |
| 15 | Application report presentations | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 42 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) | 2 | 10 | 20 |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 18 | 18 |
| Final exam and Preparation | 1 | 35 | 35 |
| Total Workload (Hours) |  |  | 157 |
| Total Workload (Hours)/30 |  |  | 5.23 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Prof. Dr. Ferhunde ATAY

**Signature**: 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316005 | **COURSE NAME** | BIOPHYSICS II |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****)]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | There is no prerequisite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | Molecular mechanics, cell-scale energy and signaling, physical basis of vision and hearing, experimental techniques. | | | | | |
| **COURSE OBJECTIVES** | | | | | To examine and understand biological systems and some events taking place in these systems using physical concepts. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Gains basic information about cell biology and molecular biology, interprets biological events from a physical point of view. | | | | | |
| **COURSE OUTCOMES** | | | | | The student who successfully completes this course;   1. Knows the basic concepts of cell biology and molecular biology. 2. Interpret the physiological processes of the body from a physical point of view. 3. Relate the physics knowledge practically. | | | | | |
| **TEXTBOOK** | | | | | Prof.Dr. Ferit Pehlivan, Biyofizik, Hacettepe-Taş, Ankara, 2005. | | | | | |
| **OTHER REFERENCES** | | | | | Berg, H. C. (1993). Random Walks in Biology. New Jersey: Princeton University Pres.  Boal, D. (2002). Mechanics of the Cell. New York: Cambridge Pres.  Gürbüz Çelebi. (1995). Biyomedikal Fizik. İzmir: Barış Yayınları. Arberts B., et.al. (2002). Molecular Biology of the Cell. Garland Science. de Gennes, P-G. (1979). Scaling Concepts in Polymer Physics. Ithaca: Cornell University Press.  Doi, E., Edwards, S. F. (1999). The Theory of Polymer Dynamics.  Oxford: Oxford University. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | There is no tools and equipment required for this course. | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Biofilaments and their properties |
| 2 | Introduction to molecular mechanics; stress, strain and other effective deformation types |
| 3 | Examples of deformations encountered in cell size and their applications |
| 4 | Viscoelastic properties in biorheology and biological systems |
| 5 | Energy and signaling in the cell |
| 6 | Cell membrane and its mechanical properties |
| 7 | Physical basis of signal transmission in nerve cells |
| 8 | Mid-term exam |
| 9 | Specialized cells |
| 10 | Physics of perception (Surface sensing) |
| 11 | Physics of perception (Chemical sensing) |
| 12 | Physics of vision |
| 13 | Physical of hearing |
| 14 | Experimental techniques; AFM, NMR, SPR |
| 15 | Experimental techniques; optical tweezers and other micromanipulation techniques |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws, and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 25 | 25 |
| **Total Workload (Hours)** |  |  | 138 |
| **Total Workload (Hours)/30** |  |  | 4.6 |
| **ECTS Credits of the Course** |  |  | 5 |

**Instructor(s):** Assoc. Prof. Sertaç EROĞLU **Date:** 19.08.2022

**Signature:**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316007 | **COURSE NAME** | APPLICATIONS OF DIGITAL ELECTRONICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Multivibrator circuits, Counter and data transfer registers, Computer timing and control, computer memory, arithmetic operations, input/output operations | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main objective of the course is to provide an understanding of the fundamentals of digital electronics. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | - | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. Will be able to learn multivibrator circuits 2. Will be able to understand counters and data transfer registers 3. Ability to identify, formulate and solve problems in the relevant branch   4. Ability to directly relate and apply the acquired knowledge with technology and industry | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Howard, M. Berlin (1985). Digital Electronics and experiments , Reston; Reston Publishing company 2. Glasford , Glenn M. (1988) . Digital Electronic circuits. London; Prentice – Hall International Editions 3. Boylestad, R. & Nashelsky, L. (1978). Electronic devices and circuit theory. New Jersey, Prentice-Hall Inc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Projection and computer | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Multivibrator circuits | | | | | | | | | | |
| 2 | Multivibrator circuits | | | | | | | | | | |
| 3 | Counter and data transfer registers | | | | | | | | | | |
| 4 | Counter and data transfer registers | | | | | | | | | | |
| 5 | Counter and data transfer registers | | | | | | | | | | |
| 6 | Computer timing and control | | | | | | | | | | |
| 7 | Computer timing and control | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Computer memory | | | | | | | | | | |
| 10 | Computer memory | | | | | | | | | | |
| 11 | Computer memory | | | | | | | | | | |
| 12 | Arithmetic operations, input/output operations | | | | | | | | | | |
| 13 | Arithmetic operations, input/output operations | | | | | | | | | | |
| 14 | Arithmetic operations, input/output operations | | | | | | | | | | |
| 15 | Arithmetic operations, input/output operations | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 3 | 36 |
| Homework | 12 | 2 | 24 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 25 | 25 |
| Total Workload (Hours) |  |  | 142 |
| Total Workload (Hours)/30 |  |  | 4.73 |
| ECTS Credits of the Course |  |  | 5 |

**Instructor(s):** Murat KELLEGÖZ, Ph.D.

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821316004 | **COURSE NAME** | INTRODUCTION TO PLASMA PHYSICS II |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 6 | 3 | | 0 | 0 | | 3 | 5 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | For low-pressure discharges, The voltage-current characteristic; Dark Townsend discharge, Glow discharge, Arc discharge,; Kaufmann rule, The first Townsend coefficient, Breakdown voltage and Paschen's law, Glow discharge; Discharge cathodic region, Positive column, The anodic discharge region, Discharge parameters, Arc discharge | | | | | |
| **COURSE OBJECTIVES** | | | | | Types and characteristics of electrical discharge | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Learning types and characteristics of electrical discharge, the voltagecurrent characteristics of the learning for low-pressure discharges, Glow discharge, Arc discharge,analysis to explain natural phenomena, to analyze the data, evaluating, testing and design, acquired the information directly with technology association and implementation, team work ability, professional knowledge of contemporary issues. | | | | | |
| **COURSE OUTCOMES** | | | | | Learning the basics of plasma, plasma and plasma characteristics of understanding, understanding nature, plasmas, plasma classification learning. Learning the basic phenomena of low-pressure plasmas. To analyze the data, evaluate, and design of experiment. | | | | | |
| **TEXTBOOK** | | | | | Ekem, N. Musa, G., Akan, T (2001), Plazma Fiziği Ders Notları, Eskisehir. | | | | | |
| **OTHER REFERENCES** | | | | | Roth,A. (1995) , Vacuum Technology, Amsterdam: Elsevier Publishing Company, Lieberman,M. , Lichtenberg,A.L., Principles of Plasma  Discharges And Materials Processing, New York, Wiley-Interscience  Publication McDaniekl, E.W. (1964) , Collision Phenomena in Ionized Gases, WileySons,Inc. Grill,A. (1993), Cold Plasma in Materials Fabrcation, IEEE Press Marr,G.V. (1968) , Plasma Spectroscopy, Elsevier Publishing Company Griem,H.R., Plasma Spectroscopy, McGraw-Hill Company | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | - | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Vacuum Science |
| 2 | Pumps |
| 3 | Investigation of Discharge Tubes |
| 4 | Thermodynamic Equilibrium |
| 5 | Thermodynamic Equilibrium |
| 6 | Thin Film Coating Systems |
| 7 | Thermionic Vacuum Arc (TVA) |
| 8 | Midterm exam |
| 9 | Sputtering systems (-RF and-RF magnetron,-DC,-DC magnetron) |
| 10 | Thermal Evaporation Technique (Thermal Evaporation) |
| 11 | Thermal Evaporation Technique (Thermal Evaporation) |
| 12 | Evaporation Technique Vascular Electron (e - Beam Evaporation) |
| 13 | Chemical Vapor Deposition Technique [Chemical Vapor Deposition (CVD)] |
| 14 | Vascular Molecular Epitaxy Technique (Moleculer beam Epitaxy, MBE) |
| 15 | General Information on Materials Analysis and Techniques |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 3 | 42 |
| Homework | 1 | 10 | 10 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 20 | 20 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) |  |  | 144 |
| Total Workload (Hours)/30 |  |  | 4.8 |
| ECTS Credits of the Course |  |  | 5 |

Prof. Dr. Suat Pat **Date:** 19.08.2022

:

# Course Information Form

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317032 | **COURSE NAME** | FIBER OPTICS |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** | |
| 7 | | 2 | | 2 | 0 | | 4 | 7 | COMPULSORY ( ) ELECTIVE (X) | | Turkish | |
| **COURSE CATEGORY** | | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** | |
| X | | |  | | | X | | | | |  | |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** | |
| 1st Mid-Term Exam | | | | 1 | 30 | |
| 2nd Mid-Term Exam | | | |  |  | |
| Quiz | | | |  |  | |
| Homework | | | | 1 | 20 | |
| Project | | | |  |  | |
| Report | | | |  |  | |
| Others (………) | | | |  |  | |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 50 | |
| **PREREQUISITE(S)** | | | | | |  | | | | | | |
| **COURSE DESCRIPTION** | | | | | | Optical Fiber Communications Systems; Optical Fibers; Nature of Light; Fundamental Optics Laws and Definitions; Optical Fibers Modes and Configurations; Fiber Types; Rays and Modes; Rays Optics; Wave Optics. | | | | | | |
| **COURSE OBJECTIVES** | | | | | | To teach basic concepts and knowledge associated with fiber optics and to apply the fundamental mathematical relations that used the optical communications. | | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To analyze natural phenomena by explain, working with different occupational groups since this subject interdisciplinary field. | | | | | | |
| **COURSE OUTCOMES** | | | | | | Ability to apply information that concerned with the technology. | | | | | | |
| **TEXTBOOK** | | | | | | Fiber Optik, Özsoy S., Birsen Yayınevi, 1998. | | | | | | |
| **OTHER REFERENCES** | | | | | | An Introduction to Fiber Optic Systems, Powers J., Irwin. 1997. | | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Computer and Projector | | | | | |  |
|  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Overview of Optical Fiber Communications | | | | | | | | | | | |
| 2 | Evolution of Fiber Optic Systems | | | | | | | | | | | |
| 3 | Elements of Optical Fiber Transmission Link | | | | | | | | | | | |
| 4 | Optical Fibers | | | | | | | | | | | |
| 5 | Nature of Light, Linear, Elliptical and Circular Polarization | | | | | | | | | | | |
| 6 | Fundamental Optics Laws and Definitions | | | | | | | | | | | |
| 7 | Fiber Optics Modes and Configurations | | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | | |
| 9 | Fiber Types, Rays and Modes | | | | | | | | | | | |
| 10 | Step index fiber structure and Graded index fiber structure | | | | | | | | | | | |
| 11 | Ray Optics Representation | | | | | | | | | | | |
| 12 | Longitudinal and skew rays | | | | | | | | | | | |
| 13 | Wave Optics, Dielectric Slab Waveguide | | | | | | | | | | | |
| 14 | Losses in Optical Fibers | | | | | | | | | | | |
| 15 | Production of Optical Fibers | | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 1 | 25 | 25 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 45 | 45 |
| Final exam and Preparation | 1 | 45 | 45 |
| Total Workload (Hours) |  |  | 227 |
| Total Workload (Hours)/30 |  |  | 7.56 |
| ECTS Credits of the Course |  |  | 8 |

Dr. Öğr. Üyesi Ali ÇETİN

: **Date:** 19.08.2022

**ESOGÜ Physics Department Course Information Form**

|  |
| --- |
| **SEMESTER** |

FALL

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317018 | **COURSE NAME** | PHOTOVOLTAIC SOLAR CELLS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | | 1 | 30 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Semiconductor thin films, Application areas of semiconductor thin films, Semiconductor thin film solar cells, Production techniques of semiconductor thin films, Production of semiconductor materials that can be used in photovoltaic solar cells, Examining the electrical, optical, structural and surface properties of the films, determination of the usability of the produced films in solar cells by evaluating the obtained data. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To teach polycrystalline semiconductor thin film solar cells, to teach the production and characterization of thin films that can be used in photovoltaic solar cells. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | 1. To gain experience on material production and characterization for technological applications. 2. To gain the ability to apply in practice. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1.Knows the basic concepts of semiconductor thin film solar cells.   1. Knows the production of semiconductor thin films that can be used in photovoltaic solar cells. 2. Knows to examine the electrical, optical, structural and surface properties of the films produced. | | | | | |
| **TEXTBOOK** | | | | | | Harold J. Hovel, Semiconductors and semimetals, vol. 11 Solar Cells | | | | | |
| **OTHER REFERENCES** | | | | | | 1. John P. McKelvey, Solid State and Semiconductor Physics. 2. Physics of Solar Cells: From Basic Principles to Advanced Concepts, Peter Würfel, 2009. 3. Thin Film Solar Cells: Fabrication, Characterization and Applications, Jef Poortmans, 2006 4. Prof.Dr. Kaşif ONARAN, Malzeme Bilimi. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Semiconductor thin films, Semiconductor thin film solar cells | | | | | | | | | | |
| 2 | Production techniques and application areas of semiconductor thin films | | | | | | | | | | |
| 3 | Selection of the semiconductor material to be produced | | | | | | | | | | |
| 4 | Literature research | | | | | | | | | | |
| 5 | Literature research | | | | | | | | | | |
| 6 | Literature research | | | | | | | | | | |
| 7 | Selection of semiconductor material production technique | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Production of semiconductor materials | | | | | | | | | | |
| 10 | Investigation of the electrical properties of the films produced | | | | | | | | | | |
| 11 | Investigation of the electrical properties of the films produced | | | | | | | | | | |
| 12 | Investigation of the optical properties of the films produced | | | | | | | | | | |
| 13 | Investigation of the structural properties of the films produced | | | | | | | | | | |
| 14 | Investigation of the surface properties of the films produced | | | | | | | | | | |
| 15 | Report and presentation | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 8 | 112 |
| Homework | 1 | 12 | 12 |
| Project (including preparation and presentation time, if any) | - | - | - |
| Report (including preparation and presentation time, if any) | 1 | 12 | 12 |
| Presentation (including preparation time) | - | - | - |
| Quiz and preparation (Quiz) | - | - | - |
| Midterm and preparation | 1 | 18 | 18 |
| Final exam and Preparation | 1 | 35 | 35 |
| Total Workload (Hours) |  |  | 245 |
| Total Workload (Hours)/30 |  |  | 8.17 |
| ECTS Credits of the Course |  |  | 8 |

Prof. Dr. Ferhunde ATAY

: **Date:** 19.08.2022

**9.08.**

# ESOGÜ Physics Department Course Information Form

|  |
| --- |
| **SEMESTER** |

FALL

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317035 | **COURSE NAME** | SOLAR ENERGY APPLICATIONS |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | 2 | | 2 | - | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
| X | |  | | |  | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | Ödev | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | To provide understanding of the physical properties of semiconductor thin films and their importance in technology. | | | | | |
| **COURSE DESCRIPTION** | | | | | Solar Energy Applications and Semiconductor Thin Film Production | | | | | |
| **COURSE OBJECTIVES** | | | | | Production and analysis of semiconductor thin films used in solar energy and electricity generation from solar energy | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | To comprehend the importance of physical properties of semiconductor films in technological applications.  To learn and apply thin film coating techniques.  Comprehending semiconductor technology and its importance.  Gaining knowledge and skills on clean energy sources and solar cells. | | | | | |
| **COURSE OUTCOMES** | | | | | Knows the techniques, types and basic concepts used in the creation of semiconductor films.  Knows the characterization of semiconductor films.  Comprehends the place and importance of semiconductor and metal and insulator materials in daily life and technology.  Monitoring and evaluating the developments in the field, applying their knowledge  Understanding professional and ethical responsibility, Effective written and verbal communication skills. | | | | | |
| **TEXTBOOK** | | | | | Güneş Enerjisi ve Uygulamaları, Prof. Dr. H. Hüseyin Öztürk, BİRSEN  YAYINEVİ  Jasprit, Singh, Semiconductor Optoelectronics, Physics and  Technology, McGraw-Hill Series, 1995  McKELVEY, John P., Solid State and Semiconductor Physics, SZE, S.M.; Semiconductor Devices, 1981. | | | | | |
| **OTHER REFERENCES** | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | |  | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Renewable Energy and Resources |
| 2 | Solar Energy and Applications |
| 3 | Semiconductor thin films |
| 4 | Semiconductor thin films |
| 5 | Thin Film Production Techniques and Application Areas |
| 6 | Production Method Selection (Literature research) |
| 7 | Selection of Semiconductor Material (Literature research) |
| 8 | Mid-term exam |
| 9 | Production of semiconductor materials by Ultrasonic Chemical Spraying technique (UKP) |
| 10 | Analysis techniques and devices to be used in the characterization of the films produced |
| 11 | Examination of the optical properties of the produced films (UV and visible Absorption Spectroscopy |
| 12 | Examination of the structural properties of the produced films (XRD) |
| 13 | Examining the surface properties of the produced films (Atomic Force Microscopy) |
| 14 | Luminescence Spectroscopy (PL) |
| 15 | Investigation of the electrical properties of the produced films |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 5 | 70 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 5 | 70 |
| Homework | 1 | 20 | 20 |
| Project (including preparation and presentation time, if any) | 1 | 20 | 20 |
| Report (including preparation and presentation time, if any) | 1 | 20 | 20 |
| Presentation (including preparation time) | 1 | 20 | 20 |
| Quiz and preparation (Quiz) | 0 | 0 | 0 |
| Midterm and preparation | 1 | 3 | 3 |
| Final exam and Preparation | 1 | 3 | 3 |
| Total Workload (Hours) |  |  | 226 |
| Total Workload (Hours)/30 |  |  | 7.53 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Dr. Öğr. Üyesi Sema KURTARAN

**Signature**:

**Date:**19.08.2022

# Course Information Form

|  |
| --- |
| **SEMESTER** |

FALL

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317020 | **COURSE NAME** | THIN FILM APPLICATIONS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | - | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | | 2 | 40 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Presentation | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Introduction to Material Science, Vacuum science and technology, Thin film growth mechanisms, Physical vapour deposition, Chemical vapour deposition, Thin film characterization: optical, electrical and surface properties. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To train students who have gained knowledge and experimental skills on thin film production and characterization. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | | To gain knowledge and skills about thin film coatings in the field of materials science, laboratory research culture and device usage skills. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1.Evaluate thin film production from an atomic perspective and understand the mechanisms in the film formation process  2.Know the basic mechanisms of different thin film production techniques   1. Have knowledge about Thin Film Characterization techniques 2. Acquire skills in device use in thin film characterization | | | | | |
| **TEXTBOOK** | | | | | | The Material Science of Thin Films, Milton Ohring | | | | | |
| **OTHER REFERENCES** | | | | | | - | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Available devices in thin film production Research Laboratory and Semicondcutor Characterization Research Laboratory, consumables for materials to be studied | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Introduction to material science and importance of thin films | | | | | | | | | | |
| 2 | Vacuum Science and Technology | | | | | | | | | | |
| 3 | Chemical Vapour Deposition | | | | | | | | | | |
| 4 | Physical Vapour Deposition | | | | | | | | | | |
| 5 | Thermal Evaporation Technique | | | | | | | | | | |
| 6 | Thermal Evaporation Technique (Lab. Application) | | | | | | | | | | |
| 7 | Thermal Evaporation Technique (Lab. Application) | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Thin Film Characterization Techniques: General view | | | | | | | | | | |
| 10 | Optical Properties of Thin Films | | | | | | | | | | |
| 11 | UV-VIS Spectrophotometer (Lab. Application) | | | | | | | | | | |
| 12 | Electrical Properties of Thin Films | | | | | | | | | | |
| 13 | Two probe and Four Probe Techniques (Lab. Application) | | | | | | | | | | |
| 14 | Surface Properties of Thin Films | | | | | | | | | | |
| 15 | Atomic Force Microscope (Lab. Application) | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) | 2 | 30 | 60 |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 60 | 60 |
| Total Workload (Hours) |  |  | 232 |
| Total Workload (Hours)/30 |  |  | 7.73 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Prof. Dr. İdris AKYÜZ

**Signature**:

**Date:**19.08.2022

|  |
| --- |
| **SEMESTER** |

FALL

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317024 | **COURSE NAME** | INTRODUCTION TO QUANTUM ELECTRONICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 40 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 60 | 60 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data, Interdisciplinary knowledge association and application | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data,  Interdisciplinary knowledge association and application | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data,  Interdisciplinary knowledge association and application | | | | | |
| **COURSE OUTCOMES** | | | | | | The main aim of the course is Learning of laser physics and lasers.Teaching of laser physics, Apply knowledge of natural sciences (Mathematics, Physics, Chemistry), Justify and analyze natural phenomena, Identify, formulate, and solve field related problems, Design and conduct experiments as well as to analyze and interpret data,  Interdisciplinary knowledge association and application | | | | | |
| **TEXTBOOK** | | | | | | "Quantum Electronics"3rd ed.,A.Yariv,J. Wiley&Sons,1989 | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Schröndinger Wave Equatıon | | | | | | | | | | |
| 2 | Schröndinger Wave Equatıon Of Tımeless Of Independed Solutıon | | | | | | | | | | |
| 3 | Quantum Mechanıcs Basıs | | | | | | | | | | |
| 4 | Harmonic Osılator | | | | | | | | | | |
| 5 | Global Symmetrıc Inthe Fıeld Of Schröndinger Wave Equatıon Of Solutıon | | | | | | | | | | |
| 6 | Quantum Mechanıcs Of Matrix Dısplay | | | | | | | | | | |
| 7 | Eigen Value And Eigenfunctıon | | | | | | | | | | |
| 8 | Mid-Term Exam | | | | | | | | | | |
| 9 | Heısenberg Movement Equatıon | | | | | | | | | | |
| 10 | Densıty Matrıx And Aplıcatıon | | | | | | | | | | |
| 11 | Elektromagnetic Fields And Quantızatıon | | | | | | | | | | |
| 12 | Elektromagnetic Wave Crıystal | | | | | | | | | | |
| 13 | Radıtatıon Fıelds Of Quantızatıon | | | | | | | | | | |
| 14 | Radıtatıon Fıelds Of Quantızatıon | | | | | | | | | | |
| 15 | Radıtatıon Fıelds Of Quantızatıon | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 2 | 36 | 72 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 2 | 12 | 24 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 24 | 24 |
| Total Workload (Hours) |  |  | 232 |
| Total Workload (Hours)/30 |  |  | 7.73 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Prof.Dr.Erol TAŞAL

**Signature**:  19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317033 | **COURSE NAME** | ELECTRONIC PROPERTIES OF MATERIALS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAG**  **E** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE (X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Writen | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Theory of reaction velocity, phase converters kinetic, diffussion, I Fick’s law, II. Fick’s law, Liquid-solid converters, electronic properties, electron models. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Electrical properties of materials | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | |  | | | | | |
| **TEXTBOOK** | | | | | | Electronic properties of materials, Adnan TEKİN, 1986 | | | | | |
| **OTHER REFERENCES** | | | | | | Solidstate books | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Theory of reaction velocity | | | | | | | | | | |
| 2 | Phase converters kinetic | | | | | | | | | | |
| 3 | Diffussion | | | | | | | | | | |
| 4 | Diffussion types at solids | | | | | | | | | | |
| 5 | Surface diffussion | | | | | | | | | | |
| 6 | I. Fick law | | | | | | | | | | |
| 7 | II. Fick law | | | | | | | | | | |
| 8 | Diffusion couple (Mid-Term) | | | | | | | | | | |
| 9 | Chemical diffusion | | | | | | | | | | |
| 10 | Oksidation | | | | | | | | | | |
| 11 | Liquid-solid converters | | | | | | | | | | |
| 12 | Electron models | | | | | | | | | | |
| 13 | Conductors and insulators | | | | | | | | | | |
| 14 | Thermal energy and specific heat | | | | | | | | | | |
| 15 | The electronic structure of the solids | | | | | | | | | | |
| 16,17 | Free electron theory | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 50 | 3 | 150 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 20 | 20 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 236 |
| Total Workload (Hours)/30 |  |  | 7.86 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Dr. Öğr. Üyesi Mehmet PEKER

**Signature**:  19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317034 | **COURSE NAME** | PRINCIPLES OF MAGNETIC RESONANCE |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theor y** | | **Practice** |  | | **Credit** | **ECTS** | **TYPE** | | **LANGUAG**  **E** |
| Fall | | 2 | | 2 |  | | 3 | 8 | COMPULSORY ( ) ELECTIVE  (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 40 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Principles of resonance, Magnetic dipole broadening in rigid lattices, Magnetic interaction of electrons with nuclei | | | | | |
| **COURSE OBJECTIVES** | | | | | | Principles of Resonance | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Developing the skills of reaching information, selecting and compiling the collected information, preparing for scientific presentation and discussion by using the course topics. | | | | | |
| **COURSE OUTCOMES** | | | | | | Realizes the Principles of Magnetic Resonance.  Learns how to reach oral, written and visual resources.  Realizes scientific research and work ethic.  He realizes that he can work on any subject in his field. | | | | | |
| **TEXTBOOK** | | | | | | Principles of Magnetic Resonance, Charles P. Slichter; 1984 | | | | | |
| **OTHER REFERENCES** | | | | | | Physics of Atoms and Molecules, B.H. Bransden, C.J. Joachain, 1999, Introduction to Solid State Physics, C. Kittel, 1996 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Principles of resonance | | | | | | | | | | |
| 2 | Principles of resonance | | | | | | | | | | |
| 3 | Basic theory | | | | | | | | | | |
| 4 | Basic theory | | | | | | | | | | |
| 5 | Basic theory | | | | | | | | | | |
| 6 | Application with the examples of solid state physics | | | | | | | | | | |
| 7 | Magnetic dipole broadening in rigid lattices | | | | | | | | | | |
| 8 | Magnetic dipole broadening in rigid lattices | | | | | | | | | | |
| 9 | Magnetic dipole broadening in rigid lattices | | | | | | | | | | |
| 10 | Magnetic dipole broadening in rigid lattices | | | | | | | | | | |
| 11 | Application with the examples of solid state physics | | | | | | | | | | |
| 12 | Magnetic interaction of electrons with nuclei | | | | | | | | | | |
| 13 | Magnetic interaction of electrons with nuclei | | | | | | | | | | |
| 14 | Magnetic interaction of electrons with nuclei | | | | | | | | | | |
| 15 | Magnetic interaction of electrons with nuclei | | | | | | | | | | |
| 16,17 | Application with the examples of solid state physics | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 50 | 3 | 150 |
| Homework | 0 | 0 | 0 |
| Project (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Report (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Presentation (including preparation time) | 1 | 20 | 20 |
| Quiz and preparation (Quiz) | 0 | 0 | 0 |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 236 |
| Total Workload (Hours)/30 |  |  | 7.86 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Dr. Öğr. Üyesi Derya PEKER

**Signature**: 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317022 | **COURSE NAME** | MOLECULAR SPECTROSCOPY |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | - | - |
| 2nd Mid-Term Exam | | | | - | - |
| Quiz | | | | - | - |
| Homework | | | | 1 | 30 |
| Project | | | | - | - |
| Report | | | | 1 | 20 |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | Homework | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | none | | | | | |
| **COURSE DESCRIPTION** | | | | | Literature review and experimental studies are done to determine the properties of a selected compound. | | | | | |
| **COURSE OBJECTIVES** | | | | | A compound to be selected and methods suitable for the examinations to be made on this compound are determined, and students should have detailed information about them; Obtaining the findings by conducting experimental studies and gaining the ability to evaluate the results by comparing them with the literature. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Increasing the ability to use the device, learning the method/methods used in the examination of the compounds, making a literature search on a selected subject, reaching the results by conducting experimental studies, discussing it and making it a written and oral presentation. | | | | | |
| **COURSE OUTCOMES** | | | | | 1. Realizes the importance of the study area. 2. Examines, collects, explains and discusses the literature related to the field of study. 3. Uses and applies previous knowledge for the study area. 4. He/she designs and conducts experiments and collects data about his/her work. 5. Combines, interprets, evaluates, discusses and finally organizes and presents the results of the study in writing. 6. Presents and defends his/her work orally. 7. Makes a poster, exhibits and defends his/her work. | | | | | |
| **TEXTBOOK** | | | | | 1. Gündüz, T., “İnstrumental Analiz”, Gazi Kitabevi, 2002. 2. Stuart, B. H., “Infrared Spectroscopy: Fundamentals and Applications”, Chichester : J. Wiley, 2004. | | | | | |
| **OTHER REFERENCES** | | | | | 1. Erdik, E., “Organik Kimyada Spektroskopik Yöntemler”, Gazi Kitabevi, 1998. 2. Douglas, A., Skoog, F., Holler, J., Nieman, T. A., “Principles of Instrumental Analysis”, Saunders College Publishing, 1998. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | Fume hood, magnetic stirrer, precision balance, chemical materials, spectrometers, computer. | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Literature search of the compounds to be synthesized |
| 2 | Material and Method research |
| 3 | Supply of chemical materials |
| 4 | Synthesis of Ingredient |
| 5 | Synthesis of compounds |
| 6 | Recording of IR Spectra, |
| 7 | Evaluation of spectra |
| 8 | Mid-term exam |
| 9 | Re-synthesis of non-forming compounds |
| 10 | Recording of IR spectra |
| 11 | Raman Analysis of the Compounds Formed |
| 12 | XRD Analysis of Compounds |
| 13 | Elemental Analysis of the Compounds Formed |
| 14 | Thermal Analysis of the Compounds Formed |
| 15 | Evaluation and reporting of results |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 8 | 112 |
| Homework | 1 | 12 | 12 |
| Project (including preparation and presentation time, if any) | 1 | 12 | 12 |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 18 | 18 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 18 | 18 |
| Total Workload (Hours) |  |  | 228 |
| Total Workload (Hours)/30 |  |  | 7.6 |
| ECTS Credits of the Course |  |  | 8 |

Prof. Dr. Güneş S. KÜRKÇÜOĞLU

**Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317026 | **COURSE NAME** | NANOTECHNOLOGY |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (Presentation) | | | | 1 | 20 |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Nanotechnological applications, nanotubes and other materials, nanotubes, nanotubes and structures. | | | | | |
| **COURSE OBJECTIVES** | | | | | | The main aim of the course is to introduce the experimental techniques that are customary in nanotechnology research laboratories, the interpretation of results, the most frequently used basic concepts in nanoscience related to nanomaterials and nanomaterial applications. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To make students aware of current materials science and nanotechnology applications and to open their horizons to make them useful products with nanotechnology. | | | | | |
| **COURSE OUTCOMES** | | | | | | Students learn the relationships between materials at nanoscale, along with their material information; will learn about which method and how the properties of materials can be produced according to the place of use. | | | | | |
| **TEXTBOOK** | | | | | | 1. Towards the World of Nanotechnologies, Prof. Dr. Tarık Baykara,   Nobel Publishing, 2016, Ankara   1. Fundamentals of Nanotechnology, Jeremy Ramsden, Trans. Alper   İnce, METU Publishing, 2011, Ankara | | | | | |
| **OTHER REFERENCES** | | | | | | Introduction to Nanotechnology, M. Wilson, K. Kannnagara, G. Smith, M. Simmons, B. Raguse, Trans: E. Şentürk, İ. Okur, S. Duman, S.  Akbulut, Change Publications, 2012, Istanbul. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Nanotechnology Applications and Nanotechnological Products | | | | | | | | | | |
| 2 | Introduction to Nanotechnology | | | | | | | | | | |
| 3 | Basic Theoretical Fundamentals of Nanotechnology | | | | | | | | | | |
| 4 | Characterization Methods of Nano Materials (SEM, TEM) | | | | | | | | | | |
| 5 | Characterization Methods of Nano Materials (afm, STM) | | | | | | | | | | |
| 6 | Nanomaterials: Nanotubes, Nanotels | | | | | | | | | | |
| 7 | Carbon-based nanomaterials | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Nanoelectronics | | | | | | | | | | |
| 10 | nanosensors | | | | | | | | | | |
| 11 | Nanotechnology in Nature | | | | | | | | | | |
| 12 | Nanotechnology application areas | | | | | | | | | | |
| 13 | Application areas of nanotechnology | | | | | | | | | | |
| 14 | Bottom-Up Production Methods of Nanomaterial | | | | | | | | | | |
| 15 | Top-down Production Methods of Nanomaterial | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 50 | 3 | 150 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 20 | 20 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 236 |
| Total Workload (Hours)/30 |  |  | 7.86 |
| ECTS Credits of the Course |  |  | 8 |

Doç. Dr. Sinem BOYRAZ

**Date:** 19.08.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317039 | **COURSE NAME** | NUCLEAR TECHNOLOGIES |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY() ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
| X | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Thorium-based nuclear reactors, Applications of neutron physics in medicine, industry, military, pharmacy and heavy industry industry, mine and mine detection with neutron physics, cancer treatment with proton accelerators, Pycno-nuclear reactions, direct reactions and astrophysical nuclear reactions, neutron physics and radioisotope production, nuclear reactor designs with 11B + p reactions. | | | | | |
| **COURSE OBJECTIVES** | | | | | | It is aimed to understand the application areas of nuclear technologies in technology, industry and science. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | | To provide information about the current research topics of technological studies in nuclear. Developing the ability to study and publish the acquired knowledge. | | | | | |
| **TEXTBOOK** | | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Thorium-based nuclear reactors | | | | | | | | | | |
| 2 | Applications of neutron physics in medicine | | | | | | | | | | |
| 3 | Applications of neutron physics in industry | | | | | | | | | | |
| 4 | Military applications of neutron physics | | | | | | | | | | |
| 5 | Pharmaceutical applications of neutron physics | | | | | | | | | | |
| 6 | Applications of neutron physics in heavy industry industry | | | | | | | | | | |
| 7 | Mine detection with neutron physics | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Mineral detection with neutron physics | | | | | | | | | | |
| 10 | Cancer treatment with proton accelerators | | | | | | | | | | |
| 11 | Pycno-nuclear reactions | | | | | | | | | | |
| 12 | Astrophysical nuclear reactions with direct reactions | | | | | | | | | | |
| 13 | Radioisotope production by neutron physics | | | | | | | | | | |
| 14 | Nuclear Reactor designs | | | | | | | | | | |
| 15 | Nuclear reactor design with 11B+p reactions | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 1 | 25 | 25 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 45 | 45 |
| Final exam and Preparation | 1 | 45 | 45 |
| Total Workload (Hours) |  |  | 227 |
| Total Workload (Hours)/30 |  |  | 7.56 |
| ECTS Credits of the Course |  |  | 8 |

Dr. Ali İhsan KILIÇ

**Date:** 07.11.2022

|  |  |
| --- | --- |
| **SEMESTER** | FALL |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317037 | **COURSE NAME** | PROTON EXCHANGE MEMBRANE FUEL CELLS |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theor y** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAG**  **E** |
| 7 | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( x ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 20 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 2 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (Pesentation) | | | | 1 | 20 |
| **FINAL EXAM** | | | | |  | | | | 1 | 40 |
| **PREREQUISITE(S)** | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | Historical development of proton exchange membrane fuel cell, components, working principle, electrochemistry, thermodynamics, efficiency, advantages and disadvantages compared to other fuel cells, application areas, production under laboratory conditions, electrical analysis. | | | | | |
| **COURSE OBJECTIVES** | | | | | To comprehend the structure, thermodynamics, electrochemistry, usage areas and production of the proton exchange membrane fuel cell, which is one of the fuel cell types, within the studies for a healthier environment and sustainable technological development. Gaining the production and analysis skills of the proton exchange membrane fuel cell in the current laboratory. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | To establish a scientific basis in the field of proton exchange membrane fuel cells, which is one of the types of fuel cells. | | | | | |
| **COURSE OUTCOMES** | | | | | Getting to know proton exchange membrane fuel cells: To understand the structure and working principle of proton exchange membrane fuel cells: Understanding the electrochemistry and thermodynamics of proton exchange membrane fuel cells: Ability to produce fuel cells with a proton exchange membrane under laboratory conditions:To be able to make electrical analysis of proton exchange membrane fuel cells. | | | | | |
| **TEXTBOOK** | | | | |  | | | | | |
| **OTHER REFERENCES** | | | | | * Frano Barbir. (2005) PEM Fuel Cells: Theory and Practise. Elsevier Akademic Press. * Prof.Dr.Durmuş KAYA, Prof.Dr.H.Hüseyin ÖZTÜRK,   Doç.Dr.Muhammet KAYFECİ. (2017). Hidrojen ve Yakıt Pili  Teknolojisi. Umuttepe Yayınları.   * Prof.Dr.Beycan İbrahimoğlu. (2008). Hidrojenli Enerji Üreteçleri.   Nobel  Yayın Dağıtım. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | Projector and computer | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Historical development of the proton exchange membrane fuel cell. |
| 2 | Proton exchange membrane fuel cell components. |
| 3 | Working principle of a proton exchange membrane fuel cell. |
| 4 | Proton exchange membrane fuel cell efficiency. |
| 5 | Advantages and disadvantages of proton exchange membrane fuel cell compared to other fuel cells. |
| 6 | Advantages and disadvantages of proton exchange membrane fuel cell compared to other fuel cells (continued). |
| 7 | Application areas of proton exchange membrane fuel cell. |
| 8 | Mid-term exam |
| 9 | Production of proton exchange membrane fuel cell under laboratory conditions. |
| 10 | Production of a proton exchange membrane fuel cell under laboratory conditions (continued). |
| 11 | Production of a proton exchange membrane fuel cell under laboratory conditions (continued). |
| 12 | Production of a proton exchange membrane fuel cell under laboratory conditions (continued). |
| 13 | Electrical analysis of proton exchange membrane fuel cell. |
| 14 | Electrical analysis of the proton exchange membrane fuel cell (continued). |
| 15 | Electrical analysis of the proton exchange membrane fuel cell (continued). |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 4 | 48 |
| Homework | 2 | 36 | 72 |
| Project (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Report (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Presentation (including preparation time) | 1 | 18 | 18 |
| Quiz and preparation (Quiz) | 0 | 0 | 0 |
| Midterm and preparation | 1 | 15 | 15 |
| Final exam and Preparation | 1 | 15 | 15 |
| Total Workload (Hours) |  |  | 224 |
| Total Workload (Hours)/30 |  |  | 7.5 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Murat Kellegöz, Ph.D.

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317038 | **COURSE NAME** | RADIATION PROTECTION METHODS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY (X) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
| X | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 40 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Atomic structure  Radiation  Radioactivity and the law of radioactive decay  Ionizing radiation and its types  Radiation measurement  Natural and man-made sources of radiation  Biological effects of radiation  Radiation dose limits  Radiation protection methods  Applications of radiation in technology | | | | | |
| **COURSE OBJECTIVES** | | | | | | Provide basic knowledge of radiation  Understand possible hazards associated with radiation  Educating about radiation sources in the environment and protection | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | We aimed at introducing students to professions which are directly related to the nuclear physics by giving details of application areas of nuclear physics and organizing seminars in this area. | | | | | |
| **COURSE OUTCOMES** | | | | | | With a good understanding of radiation, recognize safety responsibilities for natural and manmade radiation sources | | | | | |
| **TEXTBOOK** | | | | | | “Radiological Worker I and II Training” Los Alamos National Laboratory, 1998. | | | | | |
| **OTHER REFERENCES** | | | | | | “Nuclear Physics I and II” K. S. Krane, 1988, John Wiley & Sons, Inc. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Nuclear Physics Research Lab. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Atomic structure | | | | | | | | | | |
| 2 | Radiation, radioactivity | | | | | | | | | | |
| 3 | Radioactive decay law | | | | | | | | | | |
| 4 | Natural radioactivity, radioactive half-life, Radioactive material, radioactive contamination | | | | | | | | | | |
| 5 | Ionizing radiation, types of ionizing radiation, alpha, beta, gamma radiations, x-rays, neutrons | | | | | | | | | | |
| 6 | Natural radiation sources, manmade radiation sources | | | | | | | | | | |
| 7 | Biological effects of radiation, Effects of radiation on cells, factors affecting biological damage | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Units of measuring radiation, measuring nuclear radiation | | | | | | | | | | |
| 10 | Comparison of occupational doses, radiation dose limits | | | | | | | | | | |
| 11 | Basic protective measures to reduce radiation dose | | | | | | | | | | |
| 12 | Dosimeters | | | | | | | | | | |
| 13 | Nuclear reactors | | | | | | | | | | |
| 14 | Nuclear accidents | | | | | | | | | | |
| 15 | Medical radiation procedures, industrial radiation uses | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 2 | 36 | 72 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 2 | 12 | 24 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 24 | 24 |
| Total Workload (Hours) |  |  | 232 |
| Total Workload (Hours)/30 |  |  | 7.73 |
| ECTS Credits of the Course |  |  | 8 |

Celal AŞICI, Ph.D.

**Date:**19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317028 | **COURSE NAME** | COLOR AND LIGHT FILTERS |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (Presentation) | | | | 1 | 30 |
| **FINAL EXAM** | | | | |  | | | | 1 | 40 |
| **PREREQUISITE(S)** | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | Concepts of light and color, light models, color diagrams, color models, classification of light filters, production of colored glass light filters. | | | | | |
| **COURSE OBJECTIVES** | | | | | Teaching the definition and usage areas of light, colors and light filters. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | Learns the types and applications of color filters. Professions that involve the application of light, color and filters are advantageous. | | | | | |
| **COURSE OUTCOMES** | | | | | Learning light and color concepts, light models, color diagrams. Experience of making colored glass filters by melting-quenching method. | | | | | |
| **TEXTBOOK** | | | | | Hect, E., (1989), Optik, (çev. Armağan, N) Akademi yayını, İstanbul. | | | | | |
| **OTHER REFERENCES** | | | | | Kılıç G., (2000), Işık filtreleri ve filtrelerden geçen ışığın özellikleri, Yüksek Lisans tezi ESOGU.  Çetinkaya Çolak S., (2003), Işık Filtreleri, Yüksek lisans tezi ESOGU | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | |  | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | Historical development of light |
| 2 | Theories of light |
| 3 | basic colors |
| 4 | Color models |
| 5 | Eye and color sense |
| 6 | Light Filters |
| 7 | Types of filters according to the way they are made |
| 8 | Mid-term exam |
| 9 | Uses of light filters |
| 10 | Detailed explanation of absorption filters |
| 11 | Glass definition and structure |
| 12 | Glass creation methods |
| 13 | Oxides glasses |
| 14 | Glass Making as an Absorption Filter |
| 15 | Characterization of Glass as an Absorption Filter |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  |  | X |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 50 | 3 | 150 |
| Homework | 0 | 0 | 0 |
| Project (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Report (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Presentation (including preparation time) | 1 | 20 | 20 |
| Quiz and preparation (Quiz) | 0 | 0 | 0 |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 236 |
| Total Workload (Hours)/30 |  |  | 7.86 |
| ECTS Credits of the Course |  |  | 8 |

Doç. Dr. Sadiye ÇETİNKAYA ÇOLAK

19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317029 | **COURSE NAME** | LIQUID STATE PHYSICS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAG**  **E** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 20 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 10 |
| Project | | | | 1 | 20 |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | - | | | | | |
| **COURSE DESCRIPTION** | | | | | | Description of the structure of Non-Crystalline Systems, A comparison of the Structure of the Liquid and Amorphous States with the Crystal and gaseous States, Theories fort he Structure of Non-Crystalline Materials, Analysis of XRay, Neutron and Electron Diffaction, Separation of Partial  Structures in a binary Non-Crystalline system, Pure Metals, Binary Alloys, Structural Models, partial Structures, Liquid Semiconductors, Distrubution fonctions of Liquid metals, Distrubution fonctions of Liquid  Alloys. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Crystal structural analysis of nonlinear systems, analysis of noncrystalline materials, construction techniques used to teach the structure of liquid metals and alloys | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Importance of Liquid Physics theory and applications in the field of industry and technology | | | | | |
| **COURSE OUTCOMES** | | | | | | Studies of Liquid metal and alloys structures, comment of NonCrystalline materials structure analysis. | | | | | |
| **TEXTBOOK** | | | | | | The Structure of Non-Crystalline Materials, Yoshio WASEDA McGrawHill, 1980, New York. | | | | | |
| **OTHER REFERENCES** | | | | | | Introduction to the Theory of Liquid Metals, T.E. FABER, Cambridge University 1972 London. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Description of the structure of Non-Crystalline Systems | | | | | | | | | | |
| 2 | A comparison of the Structure of the Liquid and Amorphous States with the Crystal and gaseous States | | | | | | | | | | |
| 3 | Theories fort he Structure of Non-Crystalline Materials | | | | | | | | | | |
| 4 | Analysis of X-Ray, Neutron and Electron Diffaction | | | | | | | | | | |
| 5 | Analysis of X-Ray, Neutron and Electron Diffaction | | | | | | | | | | |
| 6 | Separation of Partial Structures in a binary Non-Crystalline system | | | | | | | | | | |
| 7 | Pure Metals | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Binary Alloys | | | | | | | | | | |
| 10 | Structural Models | | | | | | | | | | |
| 11 | Structural Models | | | | | | | | | | |
| 12 | Partial Structures | | | | | | | | | | |
| 13 | Liquid Semiconductors | | | | | | | | | | |
| 14 | Distrubution functions of liquid metals | | | | | | | | | | |
| 15 | Distrubution functions of liquid alloys | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework | 1 | 20 | 20 |
| Project (including preparation and presentation time, if any) | 1 | 40 | 40 |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 20 | 20 |
| Total Workload (Hours) |  |  | 230 |
| Total Workload (Hours)/30 |  |  | 7.67 |
| ECTS Credits of the Course |  |  | 8 |

Doç. Dr. Şadan Korkmaz

19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317019 | **COURSE NAME** | ACOUSTICS IN LIQUIDS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( x ) | |  |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 20 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Ultrasonic detectors and measurement techniques, relaxation theory for liquids, thermal relaxation, viscoelastic media, absorption coefficient effect of temperature and pressure, structural relaxation, theories of sound velocity, sound velocity effect of temperature and pressure, nonlinear acoustics. | | | | | |
| **COURSE OBJECTIVES** | | | | | | By the end of this module students will be able to:  Learn ultrasound its chemical and physical effects.  Learn fundamental acoustics phenomena.  Learn ultrasonic measurement techniques. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | |  | | | | | |
| **COURSE OUTCOMES** | | | | | | Analyze and resolve acoustics phenomenon | | | | | |
| **TEXTBOOK** | | | | | | KINSLER L. E. (1982). Fundamentals of Acoustics New York :Johan Wily &Sons  Pierce A.D. (1991). Acoustics, New York: Acoustical Society of America. | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Sound and ultrasonic detectors | | | | | | | | | | |
| 2 | Sound and ultrasound measurement techniques | | | | | | | | | | |
| 3 | Relaxation theory for liquids | | | | | | | | | | |
| 4 | Thermal relaxation | | | | | | | | | | |
| 5 | Viscoelastic media | | | | | | | | | | |
| 6 | The effect of temperature on the absorption coefficient in liquid media | | | | | | | | | | |
| 7 | The effect of pressure on the absorption coefficient in liquid media | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Sound velocity theories | | | | | | | | | | |
| 10 | Sound absorption | | | | | | | | | | |
| 11 | Speed of sound in gases | | | | | | | | | | |
| 12 | Speed of sound in liquids | | | | | | | | | | |
| 13 | Effect of temperature on the speed of sound in gases and liquids | | | | | | | | | | |
| 14 | Effect of pressure on the speed of sound in gases and liquids | | | | | | | | | | |
| 15 | Non-linear acoustics | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 1 | 30 | 30 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 30 | 30 |
| Final exam and Preparation | 1 | 60 | 60 |
| Total Workload (Hours) |  |  | 232 |
| Total Workload (Hours)/30 |  |  | 232/30=7.73 |
| ECTS Credits of the Course |  |  | 8 |

Prof.Dr. Gökhan Savaroğlu

19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317027 | **COURSE NAME** | SUPERCONDUCTORS |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | |
| **Basic Science** | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | |
| **MID-TERM** | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 40 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | PRESENTATION | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | History of Superconductivity, Properties of normal state, Crystal structure, electrical conductivity, Meissner effect, London equation and solution. | | | | | |
| **COURSE OBJECTIVES** | | | | | To give basic information about superconductors. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects. | | | | | |
| **COURSE OUTCOMES** | | | | | To follow the investigations on superconductors. | | | | | |
| **TEXTBOOK** | | | | | **Poole, C. H., Prozorov, R., (2007). Superconductivity.** | | | | | |
| **OTHER REFERENCES** | | | | | Serway, R. A., (1996). Fen ve Mühendislik için Fizik, III.Cilt  Kittel, C., (1996). Katıhal Fiziğine Giriş (Translated)  **Burns, G., (1992). High-Temperature Superconductivity** | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | |  | | | | | |

|  |  |
| --- | --- |
|  | **COURSE SYLLABUS** |
| **WEEK** | **TOPICS** |
| 1 | History of superconductivity |
| 2 | Properties of normal state |
| 3 | crystal structure |
| 4 | Electrical conductivity, Thermal conductivity |
| 5 | Energy gap and effective mass, Zero resistance and transition temperature |
| 6 | Magnetic properties of solids |
| 7 | Meissner effect |
| 8 | Mid-term exam |
| 9 | Perfect diamagnetism |
| 10 | Critical field and current, Two fluid model |
| 11 | London equations |
| 12 | Thermodynamics of superconductors |
| 13 | Type I and Type II superconductors |
| 14 | Copper pairs, BCS theory |
| 15 | Vortex state, theory of Ginzburg-Landau |
| 16,17 | Final Exam |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. |  | X |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 8 | 112 |
| Homework | 1 | 12 | 12 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) | 1 | 12 | 12 |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 18 | 18 |
| Final exam and Preparation | 1 | 35 | 30 |
| Total Workload (Hours) |  |  | 240 |
| Total Workload (Hours)/30 |  |  | 240/30 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Assoc. Prof. Mustafa AKARSU

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317023 | **COURSE NAME** | Applicable Physics to Industry |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theor y** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAG**  **E** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 20 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 10 |
| Project | | | | 1 | 20 |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | There is no prerequieite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Vacuum and vacuum systems, DC glow discharge, Plasma source, Surface modification, Application of the Industrial Physics. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Fundamentals of plasma production systems and vacuum systems. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To design of vacuum systems and plasma manufacturing systems | | | | | |
| **COURSE OUTCOMES** | | | | | | Apply knowledge of natural sciences (Mathematics, Physics, Chemistry). Identify, formulate, and solve field related problems. Design and conduct experiments as well as to analyze and interpret data. Interdisciplinary knowledge association and application. Direct correlation and application of gained knowledge with technology and industry. Get a recognition of the need for, and an ability to engage in life-long learning. Gain a knowledge of contemporary issues | | | | | |
| **TEXTBOOK** | | | | | | - | | | | | |
| **OTHER REFERENCES** | | | | | | Roth,A. (1995), Vacuum Technology, Amsterdam: Elsevier Publishing Company.  Lieberman,M., Lichtenberg,A.L., Principles of Plasma Discharges And Materials Processing, New York: Wiley-Interscience Publication McDaniekl, E.W. (1964), Collision Phenomena in Ionized Gases, WileySons,Inc.  Grill,A. (1993), Cold Plasma in Materials Fabrcation, IEEE Press  Marr,G.V. (1968), Plasma Spectroscopy, Elsevier Publishing Company  Griem,H.R., Plasma Spectroscopy, McGraw-Hill Company | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Vacuum and vacuum systems (Lab. applications) | | | | | | | | | | |
| 2 | Vacuum and vacuum systems (Lab. applications) | | | | | | | | | | |
| 3 | DC glow discharge and lab. applications | | | | | | | | | | |
| 4 | DC glow discharge and lab. applications | | | | | | | | | | |
| 5 | Plasma source | | | | | | | | | | |
| 6 | Plasma source | | | | | | | | | | |
| 7 | Atmospheric plasma sources and their design | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Industrial Plasma source | | | | | | | | | | |
| 10 | Thin film production systems | | | | | | | | | | |
| 11 | Thin film production systems | | | | | | | | | | |
| 12 | Surface treatment and lab. applications | | | | | | | | | | |
| 13 | Surface treatment and lab. applications | | | | | | | | | | |
| 14 | Industrial applications of physics | | | | | | | | | | |
| 15 | Industrial applications of physics | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | **X** |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 6 | 84 |
| Homework | 1 | 20 | 20 |
| Project (including preparation and presentation time, if any) | 1 | 40 | 40 |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 20 | 20 |
| Total Workload (Hours) |  |  | 230 |
| Total Workload (Hours)/30 |  |  | 230/30=7.67 |
| ECTS Credits of the Course |  |  | 8 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Instructor(s):** Prof. Dr. Suat Pat  **Signature**: |  |  | **Date:** 19.08.2022 |
|  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317025 | **COURSE NAME** | MEDICAL IMAGING TECHNIQUES |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 30 |
| Project | | | | 1 | 40 |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 30 |
| **PREREQUISITE(S)** | | | | | | There is no prerequisite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Types of medical imaging; X-ray imaging methods; ultrasound imaging; Nuclear imaging methods; magnetic resonance imaging; Fundamentals of medical imaging detectors and algorithms. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To have knowledge about medical imaging methods and to learn the physical basis of these methods. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | The course allows the information obtained from basic physics learning to be associated with the medical imaging field, which is one of the important application areas. | | | | | |
| **COURSE OUTCOMES** | | | | | | The student who successfully completes this course;   1. Learns the basic principles and limits of medical imaging. 2. Gains knowledge about the basic components and application areas of medical imaging methods. | | | | | |
| **TEXTBOOK** | | | | | | Cho, Z. H., Jones J. P., Singh M. (1993). Foundations of Medical Imaging. New York: John Wiley. | | | | | |
| **OTHER REFERENCES** | | | | | | Tıbbi görüntüleme alanında çıkan makale ve derlemeler.  Liang, Z. P., Lauterbur, P.C.L. (2000). Principles of Magnetic  Resonance Imaging. New York: IEEE Press  NessAiver, M. (1997). All You Really Need to Know About MRI Physics. Baltimore: Simply Physics. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | There is no tools and equipment required for this course. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | X-ray imaging (X-ray) | | | | | | | | | | |
| 2 | X-ray imaging (Computerizd tomography) | | | | | | | | | | |
| 3 | Mammography and fluoroscopy | | | | | | | | | | |
| 4 | Ultrasound imaging | | | | | | | | | | |
| 5 | Nuclear imaging methods (Scintillation Camera) | | | | | | | | | | |
| 6 | Nuclear imaging methods (Single Photon Emission Computed Tomography (SPECT)) | | | | | | | | | | |
| 7 | Nuclear imaging methods (Positron Emission Tomography (PET)) | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Physical basis of magnetic resonance imaging | | | | | | | | | | |
| 10 | Magnetic resonance imaging | | | | | | | | | | |
| 11 | Imaging quality and imaging components | | | | | | | | | | |
| 12 | Introduction to imaging algorithms | | | | | | | | | | |
| 13 | Fundamentals of Fourier transform and examples | | | | | | | | | | |
| 14 | Signal processing in inverse space | | | | | | | | | | |
| 15 | Image optimization techniques | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws, and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. | X |  |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  |  | X |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  |  | X |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 5 | 70 |
| Homework | 1 | 35 | 35 |
| Project (including preparation and presentation time, if any) | 1 | 45 | 45 |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) |  |  |  |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 25 | 25 |
| **Total Workload (Hours)** |  |  | 231 |
| **Total Workload (Hours)/30** |  |  | 7.7 |
| **ECTS Credits of the Course** |  |  | 8 |

**Instructor(s):** Assoc. Prof. Sertaç EROĞLU **Date:** 19.08.2022

**Signature:**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317030 | **COURSE NAME** | SEMICONDUCTOR FILM CHARACTERIZATION |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | |  | 2 | | 3 | 8 | COMPULSORY ( ) ELECTIVE (x ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | |  |  |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | | 1 | 50 |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Production and characterization of semiconductor thin films, Optical properties, absorption and transmittance spectrum in semiconductors and determination of optical band gap of semiconductor thin films, Determination of electrical properties of semiconductor thin films, Determination of surface images and roughness values of films using atomic force microscopy. Photocatalytic activity tests to determine the usability of semiconductor thin films in photocatalytic applications. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To train well-equipped students about semiconductor thin films used in technologies based on renewable energy, solar cells and photocatalytic applications of semiconductor thin films. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Gaining knowledge and skills about semiconductor thin film production techniques and their application, semiconductor technology and photocatalytic applications, renewable energy sources and solar cells. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) 2. Identify, formulate, and solve field related problems 3. Design and conduct experiments as well as to analyze and interpret data 4. Interdisciplinary knowledge association and application 5. Direct correlation and application of gained knowledge with technology and industry 6. Get a recognition of the need for, and an ability to engage in life-long learning 7. Gain a knowledge of contemporary issues | | | | | |
| **TEXTBOOK** | | | | | | Thin Film Technology Handbook, McGraw Hill, Newyork Ohring M., (2001), Materials Science of Thin Films, Academic Press, Newyork. | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Available devices in thin film production Research Laboratory and Semicondcutor Characterization Research Laboratory, consumables for materials to be studied. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Semiconductor Thin film production | | | | | | | | | | |
| 2 | Semiconductor Thin film characterization | | | | | | | | | | |
| 3 | Optical properties | | | | | | | | | | |
| 4 | Absorption and transmittance spectra in semiconductors (Laboratory application) | | | | | | | | | | |
| 5 | Absorption and transmittance spectra in semiconductors (Laboratory application) | | | | | | | | | | |
| 6 | Determination of optical band gap in semiconductors | | | | | | | | | | |
| 7 | Electrical properties in semiconductors | | | | | | | | | | |
| 8 | Midtermexam | | | | | | | | | | |
| 9 | Four probe technique | | | | | | | | | | |
| 10 | Determination of electrical resistivity in semiconductors (Laboratory application) | | | | | | | | | | |
| 11 | Determination of electrical resistivity in semiconductors (Laboratory application) | | | | | | | | | | |
| 12 | Photocatalytic properties in semiconductors | | | | | | | | | | |
| 13 | Surface Properties | | | | | | | | | | |
| 14 | Surface imaging of films using atomic force microscopy. (Laboratory application) | | | | | | | | | | |
| 15 | Surface imaging of films using atomic force microscopy. (Laboratory application) | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 8 | 112 |
| Out of Class Study Time (Pre-study, Reinforcement) | 12 | 5 | 60 |
| Homework | 1 | 20 | 20 |
| Project (including preparation and presentation time, if any) | 1 | 10 | 10 |
| Report (including preparation and presentation time, if any) | 1 | 10 | 10 |
| Presentation (including preparation time) | 1 | 5 | 5 |
| Quiz and preparation (Quiz) | 0 | 0 | 0 |
| Midterm and preparation | 1 | 5 | 5 |
| Final exam and Preparation | 1 | 5 | 5 |
| Total Workload (Hours) |  |  | 227 |
| Total Workload (Hours)/30 |  |  | 7.56 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Assoc. Prof. Dr. Seniye KARAKAYA

**Signature**: **Date:** 19.08.2022

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317036 | **COURSE NAME** | HIGH ENERGY PHYSICS APPLICATIONS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 30 |
| 2nd Mid-Term Exam | | | | - | - |
| Quiz | | | | - | - |
| Homework | | | | - | - |
| Project | | | | - | - |
| Report | | | | - | - |
| Others (………) | | | | 1 | 20 |
| **FINAL EXAM** | | | | | | Written | | | | 1 | 50 |
| **PREREQUISITE(S)** | | | | | | There is no prerequisite or co-requisite for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | To introduce high energy and particle physics, to reveal basic information about Plasma Physics and Radiation Physics. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To form the basic concepts used in high energy and particle physics, Plasma Physics and radiation physics. To comprehend the interaction mechanism of radiation. To learn the basic applications of physics in modern medicine. To learn the current studies carried out between disciplines. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | 1. Knows the basic concepts of high energy and particle physics. 2. Knows the interactions of radiation with matter. 3. Comprehends the applications of physics in daily life. 4. Comprehends how radiation is detected and dose limits. 5. Comprehends the radiation shielding processes. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. The course encourages research in the field of high energy and particle physics. 2. The course encourages research in the field of Plasma Physics. 3. The course encourages research in the field of Radiation Physics. 4. The course introduces the physical principles of radiation and its usage areas.   5. The students follow current literature studies on Radiation Shielding. | | | | | |
| **TEXTBOOK** | | | | | | D. Griffiths, Introduction to Particle Physics.  J.E. Martin, Radyasyon ve Radyasyondan Korunma Fiziği, Palme Yayıncılık. | | | | | |
| **OTHER REFERENCES** | | | | | | 1. J. Lilley, Nükleer Fizik İlkeler ve Uygulamalar, Nobel Yayıncılık. 2. W.S.C. Williams, Nuclear and Particle Physics, Oxford University Press. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | High Energy and Particle Physics: Basic Concepts | | | | | | | | | | |
| 2 | High Energy and Particle Physics: Theoretical Applications | | | | | | | | | | |
| 3 | Theoretical and Experimental Applications in Particle Accelerators, CERN (LHC) | | | | | | | | | | |
| 4 | Theoretical and Experimental Applications in Particle Accelerators, USA (FermiLab) | | | | | | | | | | |
| 5 | Vacuum Technologies | | | | | | | | | | |
| 6 | States of matter, Plasma Physics: Basic Concepts | | | | | | | | | | |
| 7 | Thermal and Nonthermal Plasmas | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Plasma Physics Applications on medicine, biology and agriculture | | | | | | | | | | |
| 10 | Coating Technologies: Applications of Plasma Physics in the Defense, Space and Rocket industries | | | | | | | | | | |
| 11 | Plasma Spectroscopy | | | | | | | | | | |
| 12 | Tokamak, Fusion Reactors | | | | | | | | | | |
| 13 | Interactions of Radiation with Matter and Radiation Detectors | | | | | | | | | | |
| 14 | Biological Effects of Radiation, Radiation Protection, Cherenkov radiation | | | | | | | | | | |
| 15 | Current interdisciplinary studies | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  |  | X |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. |  | X |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 50 | 3 | 150 |
| Homework | 0 | 0 | 0 |
| Project (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Report (including preparation and presentation time, if any) | 0 | 0 | 0 |
| Presentation (including preparation time) | 1 | 20 | 20 |
| Quiz and preparation (Quiz) | 0 | 0 | 0 |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 236 |
| Total Workload (Hours)/30 |  |  | 236/30 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Erkan İLİK, Ph.D.

**Signature**:

**Date:**19.08.2022

**ESOGÜ Physics Department Course Information Form**

**SEMESTER**

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317021 | **COURSE NAME** | ATMOSPHERIC PRESSURE PLASMAS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE (X) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | |  | | | | | |
| **COURSE DESCRIPTION** | | | | | | Describing of Plasma, Plasma production, Plasma types, Plasma Parameters, Internal and Surface Plasma Reactions, Plasma and electromagnetic wave, Plasma and solid surface interactions, DC Gas Discharge, Breakdown and Paschen Law, Corona, AC, Dielectric  Barrier and Puls Dischrage, Flowing Plasmas, Hot and Cold Plasma Jets, Application pf Atmospheric Pressure Plasmas | | | | | |
| **COURSE OBJECTIVES** | | | | | | to explore and understand the Atmospheric Pressure Plasmas investigating their plasma parameters, and is to study internal plasma reactions and interactions plasma-solid surface | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUCATION** | | | | | | To define and analyse natural sciences, relate and apply the knowledge in an interdisciplinary concept and follow contemporary professional subjects | | | | | |
| **COURSE OUTCOMES** | | | | | | Apply knowledge of natural sciences (Mathematics, Physics, Chemistry) | | | | | |
| **TEXTBOOK** | | | | | | -. Roth, J. R. (1995). Industrial plasma engineering, vol. I, IOP publishing, Bristol and Philadelphia. | | | | | |
| **OTHER REFERENCES** | | | | | | -Grill, A. (1993). Cold Plasma in Materials Fabrication, IEEE pres, New York., -Raizer, Y. P. (1991). Gas discharge physics, SpringerVerlag, USSR.  **-**Nasser, E. (1971). Fundamentals of gaseous ionization and plasma electronics, Wiley. | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | - | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | Describing of plasma | | | | | | | | | | |
| 2 | Plasma production and DC Gas Discharge | | | | | | | | | | |
| 3 | Plasma Parameters | | | | | | | | | | |
| 4 | Total Thermodynamic Equilibrium, Local and Non-Local Thermodynamic | | | | | | | | | | |
| 5 | Describing Atmospheric Pressure Plasmas | | | | | | | | | | |
| 6 | Internal Plasma Reactions | | | | | | | | | | |
| 7 | Plasma and electromagnetic wave | | | | | | | | | | |
| 8 | Mid-term exam | | | | | | | | | | |
| 9 | Puls Discharge | | | | | | | | | | |
| 10 | Corona Discharge | | | | | | | | | | |
| 11 | Dielectric Barrier Discharge | | | | | | | | | | |
| 12 | Surface Dielectric Bariier Discharge | | | | | | | | | | |
| 13 | Hot Plasma Jet | | | | | | | | | | |
| 14 | Cold Plasma Jet | | | | | | | | | | |
| 15 | Application of Atmospheric Pressure Plasmas on Materials | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. | X |  |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. |  | X |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. | X |  |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 4 | 56 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 4 | 56 |
| Homework | 1 | 30 | 30 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 40 | 40 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 30 | 30 |
| Final exam and Preparation | 1 | 30 | 30 |
| Total Workload (Hours) | 32 | 138 | 242 |
| Total Workload (Hours)/30 |  |  | 8.1 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Prof. Dr. Tamer AKAN

**Signature**:  **Date:** 19.08.2022

# ESOGÜ Physics Department Course Information Form

|  |
| --- |
| **SEMESTER** |

FALL

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821317031 | **COURSE NAME** | CHARACTERIZATION OF GLASSY MATERIALS |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 7 | | 2 | | 2 | 0 | | 3 | 8 | COMPULSORY ( ) ELECTIVE ( X ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics Department**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
|  | | |  | | | X | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term Exam | | | | 1 | 40 |
| 2nd Mid-Term Exam | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (………) | | | |  |  |
| **FINAL EXAM** | | | | | |  | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | There are no prerequisites for this course. | | | | | |
| **COURSE DESCRIPTION** | | | | | | Recognition of amorphous structures such as glass, learning glass technology, recognition of areas of utilization, design and synthesis of glass structures with scientific content, analyzing and thus characterizing synthesized glasses. | | | | | |
| **COURSE OBJECTIVES** | | | | | | Apprehension of the fundamentals of glass science. Synthesizing glasses for scientific purposes and learning characterization techniques | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | Learning the techniques used in glass science and for students who would like to work in this field after graduation, attaining the ability to characterize these kind of structures with various techniques. | | | | | |
| **COURSE OUTCOMES** | | | | | | A student who successfully completes this course,  Recognizes amorphous materials like glass, has the ability to compare them with other materials.  Has the ability to design and synthesize glasses of scientific purposes directed to specific needs. Define any glass structure.  Use various characterization devices that can be used in establishing the optical, thermal, structural and electrical properties of synthesized glasses and has the ability to evaluate and interpret the obtained experimental data.  Has the knowledge to determined the areas of utilization for amorphous structures like glass.  Has the ability to follow-up and understand current publications on this matter. | | | | | |
| **TEXTBOOK** | | | | | | James E. Shelby, Introduction to Glass Science and Technology, 3rd Edition, Royal Society of Chemistry, 2020 | | | | | |
| **OTHER REFERENCES** | | | | | | 1. Robert H. Doremus, Glass Science, Wiley, 1994 2. Arun Varshneya, John Mauro, Fundamentals of Inorganic Glasses, 3rd Edition, Elsevier, 2019 3. D Uhlmann, Elasticity and Strength in Glasses: Glass: Science and Technology, Elsevier, 2012 | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | | Devices and chemical used in laboratory practices. These tools and equipment are already found in the research laboratory. | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | |
| 1 | What is matter? | | | | | | | | | | |
| 2 | Type of materials | | | | | | | | | | |
| 3 | Crystal and amorphous materials | | | | | | | | | | |
| 4 | Glass materials and types of glass | | | | | | | | | | |
| 5 | Glasses according to their areas of utilization | | | | | | | | | | |
| 6 | Glass synthesis | | | | | | | | | | |
| 7 | Structural theories of glass | | | | | | | | | | |
| 8 | Mid-Term EXAM | | | | | | | | | | |
| 9 | Phase separations in glass synthesis | | | | | | | | | | |
| 10 | Characterization of optical properties of glass | | | | | | | | | | |
| 11 | Structural characterization of glass | | | | | | | | | | |
| 12 | Thermal characterization of glass | | | | | | | | | | |
| 13 | Determination of physical parameters of glass | | | | | | | | | | |
| 14 | Glasses in the field of radiation shielding and their characterization | | | | | | | | | | |
| 15 | Glasses in the field of radiation shielding and their characterization | | | | | | | | | | |
| 16,17 | Final Exam | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. |  | X |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. | X |  |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. |  |  | X |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. |  | X |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. |  | X |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**: None. **2**: Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 3 | 42 |
| Out of Class Study Time (Pre-study, Reinforcement) | 50 | 3 | 150 |
| Homework | 0 | 0 | 0 |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 20 | 20 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation | 1 | 10 | 10 |
| Final exam and Preparation | 1 | 14 | 14 |
| Total Workload (Hours) |  |  | 236 |
| Total Workload (Hours)/30 |  |  | 7.87 |
| ECTS Credits of the Course |  |  | 8 |

**Instructor(s):** Assoc. Prof. Dr. Gökhan KILIÇ

**Signature**: **Date:** 19.08.2022

**ESOGÜ PHYSICS DEPARTMENT**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **SEMESTER** | SPRING |

|  |  |  |  |
| --- | --- | --- | --- |
| **COURSE CODE** | 821318001 | **COURSE NAME** | VOCATIONAL EDUCATION |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER** | | **WEEKLY COURSE PERIOD** | | | | | **COURSE** | | | | |
| **Theory** | | **Practice** | **Laboratory** | | **Credit** | **ECTS** | **TYPE** | | **LANGUAGE** |
| 8 | | 5 | | 25 | 0 | | 17 | 30 | COMPULSORY (x) ELECTIVE ( ) | | Turkish |
| **COURSE CATEGORY** | | | | | | | | | | | |
| **Basic Science** | | | **Basic Engineering** | | | **Physics**  **[if it contains considerable design, mark with (****) ]** | | | | | **Social Science** |
| X | | |  | | |  | | | | |  |
| **ASSESSMENT CRITERIA** | | | | | | | | | | | |
| **MID-TERM** | | | | | | **Evaluation Type** | | | | **Quantity** | **%** |
| 1st Mid-Term | | | |  |  |
| 2nd Mid-Term | | | |  |  |
| Quiz | | | |  |  |
| Homework | | | |  |  |
| Project | | | |  |  |
| Report | | | |  |  |
| Others (VE Report) | | | | 1 | 40 |
| **FINAL EXAM** | | | | | | Others (VE Report) | | | | 1 | 60 |
| **PREREQUISITE(S)** | | | | | | No | | | | | |
| **COURSE DESCRIPTION** | | | | | | Learning the legislation in business, recognizing the business, job awareness in the business, turning theoretical knowledge into practice, awareness of professional responsibility, developing innovations related to the business, effective communication, problem detection and producing solutions, reporting, fulfilling the duties and responsibilities given in all these processes. | | | | | |
| **COURSE OBJECTIVES** | | | | | | To reinforce the acquired theoretical and applied professional knowledge with real application experiences.  Introducing the organization and operation information of the business.  To gain business discipline.  To gain the ability to act with team spirit and to work together in the institution where the business is applied.  To gain the ability to follow the developments in the field. | | | | | |
| **ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION** | | | | | | To provide the necessary knowledge to practice the professional knowledge acquired during the undergraduate education in practice. | | | | | |
| **COURSE OUTCOMES** | | | | | | 1. To have knowledge about the sector in which he received education. 2. To apply the professional knowledge in practice. 3. Being aware of professional rights and responsibilities. 4. To identify possible problems and to produce effective solutions. | | | | | |
| **TEACHING METHODS AND TECHNIQUES** | | | | | | Question - answer, practice. | | | | | |
| **TEXTBOOK** | | | | | | Documents related to the business application area. | | | | | |
| **OTHER REFERENCES** | | | | | |  | | | | | |
| **TOOLS AND EQUIPMENTS REQUIRED** | | | | | |  | | | | | |
|  | **COURSE SYLLABUS** | | | | | | | | | | | |
| **WEEK** | **TOPICS** | | | | | | | | | | | |
| 1 | Learning the legislation in the field of business, fulfilling the assigned duties and responsibilities. | | | | | | | | | | | |
| 2 | To recognize the business, to fulfill the assigned duties and responsibilities. | | | | | | | | | | | |
| 3 | Task awareness in the business, fulfilling the assigned duties and responsibilities. | | | | | | | | | | | |
| 4 | To be able to transform theoretical field knowledge into practice, to fulfill the assigned duties and responsibilities. | | | | | | | | | | | |
| 5 | Awareness of professional responsibility, fulfilling duties and responsibilities. | | | | | | | | | | | |
| 6 | To be able to develop innovations related to the business, to fulfill the assigned duties and responsibilities. | | | | | | | | | | | |
| 7 | To be able to develop innovations related to the business, to fulfill the assigned duties and responsibilities. | | | | | | | | | | | |
| 8 | Mid-Term | | | | | | | | | | | |
| 9 | To be able to develop innovations related to the business, to fulfill the assigned duties and responsibilities. | | | | | | | | | | | |
| 10 | Effective communication, fulfilling duties and responsibilities. | | | | | | | | | | | |
| 11 | To be able to identify problems and produce solutions, to fulfill the duties and responsibilities. | | | | | | | | | | | |
| 12 | To be able to identify problems and produce solutions, to fulfill duties and responsibilities. | | | | | | | | | | | |
| 13 | To be able to identify problems and produce solutions, to fulfill duties and responsibilities. | | | | | | | | | | | |
| 14 | Reporting, fulfilling duties and responsibilities. | | | | | | | | | | | |
| 15 | Reporting, fulfilling assigned duties and responsibilities. | | | | | | | | | | | |
| 16,17 | Final exam | | | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NO** | **PROGRAM OUTCOMES** | **3** | **2** | **1** |
| 1 | To understand the basic concepts, laws and relations between physics. | X |  |  |
| 2 | To gain the ability of reasoning and problem solving on physics concepts and laws. | X |  |  |
| 3 | To be equipped with the necessary mathematical tools to examine the problems of theoretical and applied physics. |  | X |  |
| 4 | Gaining the skills of designing and performing experiments and evaluating the results of the experiments in individual and team work. |  | X |  |
| 5 | To be able to analyze physics problems by using information technologies and to develop numerical models. |  | X |  |
| 6 | To gain the ability to express basic concepts and laws of physics in a simple and understandable way. | X |  |  |
| 7 | To gain awareness of professional and ethical responsibility. | X |  |  |
| 8 | Skill of effective communication orally and in writing in Turkish and ability of using/improving the knowledge of at least one foreign language. | X |  |  |
| 9 | Adopting the importance of lifelong learning, gaining the ability to following the current developments on interdisciplinary courses and scientific events and ability of renew oneself continuously. | X |  |  |
| 10 | To have the ability of acting independently, using initiative and creativity. |  | X |  |
| **1**:None. **2**:Partial contribution. **3**: Complete contribution. | |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS (WORKLOAD CALCULATION)** | | |  |
| **ACTIVITIES** | **Quantity** | **Duration (Hour)** | **Workload (Hour)** |
| Course Duration (number of weeks\* course hours per week) | 14 | 40 | 560 |
| Out of Class Study Time (Pre-study, Reinforcement) | 14 | 10 | 140 |
| Homework |  |  |  |
| Project (including preparation and presentation time, if any) |  |  |  |
| Report (including preparation and presentation time, if any) |  |  |  |
| Presentation (including preparation time) | 1 | 100 | 100 |
| Quiz and preparation (Quiz) |  |  |  |
| Midterm and preparation |  |  |  |
| Final exam and Preparation | 1 | 100 | 100 |
| Total Workload (Hours) |  |  | 900 |
| Total Workload (Hours)/30 |  |  | 30 |
| ECTS Credits of the Course |  |  | 30 |

**Instructor(s):** Physics Department Members

**Signature**:  **Date:** 19.08.2022