| Course Information | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Code** | **T** | **P** | **L** | **C** | **ECTS** | **Type** C/E | **Language** TR/ENG etc. | **Year/Semester** |
| FİZ3002 | **4** | **0** | **0** | **4** | **5** | **C** | **TR** | **3/SPRING** |
| **Course Name (**Turkish**)** | **İstatistik Fizik** | | | | | | | |
| **Course Name (**English**)** | **Statistical Physics** | | | | | | | |

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|---|---|
| **Unit/Program** | Physics Department/Undergraduate Program |
| **Course Prerequisite** | No |
| **Course Objectives** | Perception and acquisition of basic Statistical Physics concepts |
| **Course Outline** | Macroscopic systems and their descriptive properties, Basic probability concepts, statistical ensembles, Mean values, Statistical explanation of the system of particles, Number of introductable states of a macroscopic system, Magnetism, paramagnetism, average energy and average pressure of ideal gas, Microscopic theory-macroscopic measurements, Codistribution theorem and its applications |
| **Textbook/ Material / Resources** | 1. F.Reif, Statistical Physics, Berkeley Physics series, Volume 5, and F.Mandl, Statistical Physics, The Manchester Physics Series.<br>2. F. Reif. Fundamentals of Statistical and Thermal Physics, Mc Graw Hill. |
| **Internship Status** | No |

**Course Precedents**

| **University Name** | **Program Name** | **Course Name** | **T-P-L-C; ECTS** | **Type** |
|---|---|---|---|---|
| **Yeditepe University** | **Physics** | **Statistical Physics** | **4-0-0-4; 5** | **C** |
| **Eskisehir Osmangazi University** | **Physics** | **Thermodynamics and Statistical Physics** | **4-0-0-4; 7** | **C** |

| **The instructor who proposed the course (** Title, Name and Surname) | *Signature* |
|---|---|
| | |
| **Instructors who can teach the course** (Title, Name and Surname) | *Signature* |
| | |
| | |

**Academic justification for the opening of the course?** (The effect of course outcomes on program outcomes, etc.)

**Brief explanation of the course** (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

Face-to-face courses will be taught under the supervision of the relevant faculty member.

**External Stakeholder Opinions About** the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

| **Stakeholder Name** | **Opinion** (It should be given as a summary, it should not exceed two lines.) |
|---|---|
| | |
| | |

| Weekly Course Content Distribution | | |
|---|---|---|
| **Week** | **Theory** | **Application/Laboratory** |
| **1** | Macroscopic systems and their defining properties, ideal gas system, fluctuations in equilibrium state, irreversibility, approach to equilibrium state. | |
| **2** | Heat and temperature, sample quantities, ideal gas pressure, pressure-energy relationship and applications | |
| **3** | Basic probability concepts, statistical ensembles, interprobabilistic relations, Binomial distribution and applications | |
| **4** | Applications to other systems such as mean values, dispersion, standard deviation, spin system and ideal gas | |
| **5** | Statistical explanation of a system of particles, state of a system, statistical ensembles, statistical postulates, probability calculations | |
| **6** | Number of introductable states of a macroscopic system, boundary conditions, equilibrium, irreversibility, interactions between systems and applications | |
| **7** | Temperature interaction, distribution of energy between macroscopic systems, approach to temperature and temperature equilibrium | |
| **8** | Small heat transport, heat chamber and the system interacting with it, canonical distribution | |
| **9** | Midterm Exam | |
| **10** | Magnetism, paramagnetism, average energy and average pressure of the ideal gas. | |
| **11** | Microscopic theory - macroscopic measurements, entropy, enthalpy concepts and applications. | |
| **12** | Determination of absolute temperature, high and low absolute temperatures, Work, internal energy, heat, heat capacitance, entropy, dense and wide parameters | |
| **13** | Canonical distribution in classical approximation, classical approximation, discussion of Maxwell velocity distribution and its application to gases, scattering and bundles of molecules | |
| **14** | Codistribution theorem and its applications, intrinsic heat of gases and solids | |
| **15** | Final Exam | |
| **16** | | |

| Assessment | | | |
|---|---|---|---|
| **Evaluation Criteria** | **Activity** | **Custom** | **Contribution to Success Grade (%)** |
| | Midterm Exams | 1 | 40 |
| | Quizzes | | |
| | Assignments | | |
| | Projects | | |
| | Term Paper | | |
| | Laboratory | | |
| | Other | | |
| | Final Exam | 1 | 60 |
| | | **Sum:** | 100 |
| **Remarks** | | | |

| | | |
|---|---|---|
| **Content Design and Subject Weight (%)** | Mathematics and Basic Sciences | 100 |
| | Engineering Sciences | |
| | Social Sciences | |
| | Health Sciences | |
| | Educational Sciences | |
| | Culture and Art Sciences | |

| | Design Information | |
|---|---|---|

| Workload (ECTS) Calculation | | | |
|---|---|---|---|
| **Events** | **Number** | **Duration (Hours)** | **Total workload (Hours)** |
| Fieldwork | | | |
| Midterm Exam Application | 1 | 2 | 2 |
| Self-Study (including pre-class and exam preparation) | 14 | 3 | 42 |
| Make-up Exam | 1 | 2 | 2 |
| Experiment and Observation | | | |
| Class Participation (Theory) | 14 | 4 | 56 |
| Homework | | | |
| Final Exam Practice | 1 | 2 | 2 |
| Laboratory | | | |
| Article Review | | | |
| Writing an Article | | | |
| Reading | | | |
| Case Study | | | |
| Performance | | | |
| Problem Solution | | | |
| Project Preparation | | | |
| Project Submission | | | |
| Quiz | | | |
| Report Preparation | | | |
| Submitting Reports | | | |
| Role/Drama Work | | | |
| Seminar | | | |
| Oral Exam | | | |
| Team/Group Work | 7 | 3 | 21 |
| Argument | | | |
| Application/Practice | | | |
| Other | | | |
| **TOTAL WORKLOAD:** | | | **125** |
| **ECTS CREDİTS OF THE COURSE:** *(The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)* | | | **5** |

| **Program Outcomes (PO)** / **Learning Outcomes (LO)** *(Course Outcomes)* | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | Comprehend the basic principles and concepts of quantum physics. | **5** | **5** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **2** | **2** |
| **2** | Comprehend natural phenomena from a quantum mechanical point of view. | **5** | **5** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **2** | **2** |
| **3** | To be able to relate and apply information between disciplines. | **5** | **5** | **5** | **4** | **3** | **3** | **5** | **5** | **5** | **2** | **2** |

**Organizer:** Prof. Dr. Cengiz TATAR
**Preparation Date:** 20.05.2024