# DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
# COURSE SYLLABUS

| Course Details | | | | |
|---|---|---|---|---|
| **Code** | **Academic Year** | | | **Semester** |
| PHY112 | 1 | | | 2 |
| **Title** | **T** | **A** | **L** | **ECTS** |
| Physics II | 2 | 1 | 2 | 6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Language** | German | | | | | |
| **Level** | **Undergraduate** | **X** | **Graduate** | | **Postgraduate** | |
| **Department / Program** | Energy Science and Technology | | | | | |
| **Forms of Teaching and Learning** | Face-to-face | | | | | |
| **Course Type** | **Compulsory** | **X** | **Elective** | | | |
| **Objectives** | The students have gained knowledge and understanding of the most important phenomena of electrodynamics and optics and can explain and interpret them. They can transfer the knowledge to related phenomena and bring it into connection with everyday and current phenomena. The students are also familiar with the methods of experimental physics and relevant mathematical tools and can use them to solve scientific questions. | | | | | |
| **Content** | Electrostatics (field, flux, potential, Gaussian theorem, capacity), currents (resistance, Ohm's law, Kirchhoff's rules), magnetostatics (Lorentz force, Amperes law), electrostatics and magnetostatics in the medium (dielectricity, paramagnetism), induction and alternating currents (Faraday's law of induction, resonant circuits), electromagnetic fields and Maxwell's equations | | | | | |
| **Prerequisites** | None | | | | | |
| **Coordinator** | Assist. Prof. Dr. Gülsüm Gündoğdu<br>Assist. Prof. Dr. Elif Yunt | | | | | |
| **Lecturer(s)** | Assist. Prof. Dr. Gülsüm Gündoğdu<br>Assist. Prof. Dr. Elif Yunt | | | | | |
| **Assistant(s)** | Res. Assist. Berat Berkan Ünal<br>Res. Assist. Yusuf Karakaş<br>Res. Assist. Fuat Berke Gül | | | | | |
| **Work Placement** | None | | | | | |

| Recommended or Required Reading | |
|---|---|
| **Books / Lecture Notes** | Physik, Lehr- und Übungsbuch, Douglas C. Giancoli, 3. erweiterte Auflage<br>Halliday, Physik, Wiley-VCH, 2016 |
| **Other Sources** | |

| Additional Course Material | |
|---|---|
| **Documents** | |
| **Assignments** | |
| **Exams** | |

| Course Composition |
|---|

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| | | |
|---|---|---|
| **Mathematics und Basic Sciences** | 80 | % |
| **Engineering** | 10 | % |
| **Engineering Design** | | % |
| **Social Sciences** | | % |
| **Educational Sciences** | | % |
| **Natural Sciences** | 10 | % |
| **Health Sciences** | | % |
| **Expert Knowledge** | | % |

## Assessment

| Activity | Count | Percentage (%) |
|---|---|---|
| **Midterm Exam** | 1 | 30 |
| **Quiz** | 1 | 10 |
| **Assignments** | | |
| **Attendance** | | |
| **Recitations** | 5 | 20 |
| **Projects** | | |
| **Final Exam** | 1 | 40 |
| | **Total** | **100** |

## ECTS Points and Work Load

| Activity | Count | Duration | Work Load (Hours) |
|---|---|---|---|
| **Lectures** | 14 | 3 | 42 |
| **Self-Study** | 14 | 6 | 84 |
| **Assignments** | | | |
| **Presentation / Seminar Preparation** | | | |
| **Midterm Exam** | 1 | 3 | 3 |
| **Recitations** | | | |
| **Laboratory** | 10 | 3 | 30 |
| **Projects** | | | |
| **Final Exam** | 1 | 3 | 3 |
| | | **Total Work Load** | **162** |
| | | **ECTS Points** (Total Work Load / Hour) | **6** |

## Learning Outcomes

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|---|---|
| **1** | Having a theoretical understanding of electric and magnetic fields and being able to solve practical problems. |
| **2** | Being able to model and solve problems in engineering and advanced physics applications. |

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| | |
|---|---|
| **3** | Being able to find relations of electric and magnetic field concepts with other science disciplines and with the environment. |
| **4** | |
| **5** | |
| **6** | |
| **7** | |
| **8** | |
| **9** | |
| **10** | |
| **11** | |
| **12** | |

| **Weekly Content** | |
|---|---|
| **1** | Electrical charge, Electrostatics |
| **2** | Coulomb's Law, Electrical Field |
| **3** | Gauss Law |
| **4** | Voltage, Electric Potential |
| **5** | Capacitors, Dielectrics |
| **6** | Electrical Current, Resistors, Ohm's Law, Electromotive Force |
| **7** | Direct Current Ciurcuits, Kirchhoff's Law |
| **8** | Magnetic Field, Magnetic Forces |
| **9** | Sources of Magnetic Field |
| **10** | Electromagnetic Induction, Faraday's Law |
| **11** | Magnetic Materials |
| **12** | Inductivity |
| **13** | Alternating current circuits (RLC) |
| **14** | Electromagnetic waves |
| **15** | |

**Contribution of Learning Outcomes to Program Objectives (1-5)**

| | **P1** | **P2** | **P3** | **P4** | **P5** | **P6** | **P7** |
|---|---|---|---|---|---|---|---|
| **1** | 5 | 5 | | 4 | | 5 | |
| **2** | 5 | 5 | | 4 | | 5 | |
| **3** | 5 | 5 | | 4 | | 5 | |
| **4** | | | | | | | |
| **5** | | | | | | | |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **6** | | | | | | | |
| **7** | | | | | | | |
| **8** | | | | | | | |
| **9** | | | | | | | |
| **10** | | | | | | | |
| **11** | | | | | | | |
| **12** | | | | | | | |

| | |
|---|---|
| **Contribution Level** | 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High |

**P1 Working with modern scientific sources.**
**P2 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.**
**P3 Having theoretical and practical skills in the area of Energy Science and Technology.**
**P4 Having foreign language skills to follow the worldwide advancements in the field of Energy Science and Technology and to be able to discuss them with foreign colleagues.**
**P5 Having computational skills for research data analysis purposes.**
**P6 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.**
**P7 Having knowledge about work occupational work and safety.**

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| **Compiled by:** | Gülsüm Gündoğdu<br>Elif Yunt |
| **Date of Compilation:** | |