| F011 | Elective 3rd Year | **General Physics Laboratory A** | L | S | P | LE | ECTS |
|---|---|---|---|---|---|---|---|
| | | | 0 | 0 | 0 | 4 | 5 |

**Course objective.** The aim of the course is to enable a student to independently perform experiments in the field of general physics. An additional goal is to learn how to process and physically interpret obtained results. Students will create an experiment report and statistically process the results. Also, students will use a computer when processing data of some experiments.

**Prerequisites.** Competences acquired by attending the courses "General Physics I and II"

**Course content.** Introduction to laboratory work (physical size and corresponding units of measurement, the concept, accuracy and record measurements, types of errors and measured results, graphical and tabular display of measurement, safety guide for the laboratory work)
List of experimental exercises (with possibility of choosing 10 of them):

1. Caliper, micrometer screw, spherometer, scales.
2. The study of helical coils, determine the density of solid bodies using the dynamometer.
3. Mathematical and physical pendulum.
4. Static determination of torsion modules, dynamic torsion modules.
5. Determination of density by pycnometer, Mohr - Westphal balance scale.
6. Determination of surface tension of liquids, Hoppler viscometer.
7. Measurement of resistance using the Wheatstone bridge, measurement of resistance of electric light bulbs, depending on the current strength.
8. Determination of the specific charge of the electron; magnetic field around a straight guide.
9. Cathode oscillography.
10. Calibration of the precision galvanometer, temperature measurement using thermocouples.
11. Triode and transistor.

**LEARNING OUTCOMES**

| No. | LEARNING OUTCOMES |
|---|---|
| 1. | Independently conduct experiments in the field of general physics (handling measuring devices and instruments); |
| 2. | Explain physical phenomena during the performed experiments (making a connection between physical laws and their application as well as cause and effect); |
| 3. | Statistically analyse the results obtained by experiment, interpretation of the results; |
| 4. | Use a computer to process the results; |
| 5. | Make a detailed and complete laboratory report of the experiment |
| 6. | Critically use a scientific literature in which the measurement results are shown. |

**RELATING THE LEARNING OUTCOMES, ORGANIZATION OF THE EDUCATIONAL PROCESS AND ASSESSMENT OF THE LEARNING OUTCOMES**

| TEACHING | ECTS | LEARNING | STUDENT | EVALUATION | POINTS |
|---|---|---|---|---|---|

| ACTIVITY | | OUTCOME ** | ACTIVITY* | METHOD | min | max |
|---|---|---|---|---|---|---|
| Class attendance | 0,5 | 1-6 | Class attendance; Measuring and data processing | Evidence list | 5 | 10 |
| Performing the laboratory exercises | 1 | 1-6 | Measuring and data processing | Evidence list; Precision measurement and analysis of results, written verification of measurement results | 10 | 30 |
| Independent work | 2 | 1-6 | Theoretical preparation for experiments, writing reports | Oral test of preparation for the conducting of the experiment, examination of the students written preparation | 20 | 40 |
| Final exam | 1,5 | 1-6 | Performing certain exercises, data analysis and report writing | Written report and oral exam | 15 | 20 |
| TOTAL | 5 | | | | 50 | 100 |

**Teaching methods and knowledge assessment.** Laboratory exercises are mandatory, but the student can justifiably abstain from two laboratory exercises, which is obliged to compensate for the foreseen time periods Throughout the course of laboratory exercises, the student is verbally examined about the preparedness and knowledge of the experiment that is currently working on through an immediate conversation. Written preparation for laboratory exercises is also checked. After each performed experiment, the student is required to write a report that will be evaluated. The final grade is determined on the basis of the knowledge demonstrated during the course, the mid-term evaluation of the completed experiment reports and the final exam.

**Can the course be taught in English**: Yes

## Basic literature:


1. Interna skripta iz kolegija Praktikum iz osnova fizike A, dostupna na: http://kolegij.fizika.unios.hr/pof2


## Recommended literature:


1. Požek, A. Dulčić; Fizički praktikum I i II, Sunnypress, Zagreb, 1999.
2. Paić, M. Fizička mjerenja I, II i III, Liber, Zagreb, 1988.
3. B. Marković, D. Miler, A. Rubčić, Račun pogrešaka i statistika, Liber, Zagreb, 1987.