Course Number : PHYS 104	**Course Title** : Physics Laboratory II
Required / Elective : required	**Pre / Co-requisites :** -
Catalog Description: Experiments on: capacitors; DC circuits; magnetic field; Ampere's law; Faraday's law; inductance; magnetic properties of matter.	**Textbook / Required Material :** Physics Laboratory Manual, prepared by N. G. Kıyak
Course Structure / Schedule : (0+0+2) 1 / 2 ECTS	
Extended Description : **E1. Measurement:** Basics of measurement and error estimation arising from the measurements. **E2. Error estimation and graphical analysis:** Analysis of measurement errors, and graphical presentation. **E3. Measurements of potential difference with a potantiometer**: Measure an unknown electromotive force. **E4. Multiloop electrical circuits**: Kirchhoff's rules and make measurements on a circuit containing more than one source of electrical power. **E5. Charging and discharging capacitors**: Charging and discharging processes in a circuit. **E6. Temperature dependence of resistance**: Parameters which affect the resistance of conductors and study of temperature dependency. **E7. Capacitance in AC circuits**: Calculation of equivalent capacitor. **E8. Inductance in AC circuits**: AC inductive circuit elements and their properties. **E9. RLC Circuits**: Basic alternating current circuit elements and their properties. **E10. Measurements of capacitance and inductance**: Capacitance and inductance in an AC circuit. **E11. The transformer and power transmission**: Basic alternating current circuit elements and their properties. **E12. Filter circuits**: High-pass and low-pass filters and their properties. **E13. Magnetization curve of a ferromagnetic material**: Magnetic properties of a ferromagnetic substance and plot magnetization curve to see how permanent magnetization occurs. **E14. Characteristic curve of a semiconductor**: Band model of solids and properties of semiconductors. **E15. Determination of equivalent capacitance**: Equivalent capacitance in series and parallel, and calculating the stored energy.	
Design content : None	**Computer usage**: Students use computational and graphics software in the analysis of experimental data and preparation of reports.

Course Learning Outcomes [relevant program outcomes in brackets]**:**

On successful completion of this course students will be able to

1. learn the use and handle of electrical instruments and learn experimental techniques in electricity and magnetic areas of physics (1, 11).
2. learn how to design simple electrical experiments(6, 11).
3. have an ability to work in a team on multi-disciplinary projects (4, 8).
4. Improve ability to organize and analyze quantitative data (2, 11).
5. build up experience in estimating and calculating uncertainties in measurements and in derived quantities (11).
6. learn clear and accurate reporting of results (11).

Recommended reading

1. Douglas C. Giancoli, *Physics for Scientists and Engineers with Modern Physics*, Prentice Hall, New Jersey, 2000 (3rd Edition).

2. P. M. Fishbane, S. G. Gasiorowicz, S. T. Thornton, *Physics for Scientists and Engineers with Modern Physics*, Pearson Prentice Hall Inc. Third Edition, 2005.

Teaching methods

1. Discussion of theoretical background.
2. Demonstrations and videos.
3. Performing experiments and protocol measurements.
4. Group discussion and interpretation of observations.
5. Writing Lab reports.

Laboratory works of 2 hours per week, each week an experiment, 10-12 experiments over the course of the semester, pre-readings and report preperation for each experiment.

Assessment methods (Related to course outcomes)**:**

1. Formal lab reports
2. Final exam
3. Classroom observation

Student workload:

Preparatory reading	13 hrs
Experiments, discussions	25 hrs
Reports	20 hrs
Final Exam	2 hrs

TOTAL …… 60 hrs … to match 25 x 2 ECTS

Prepared by : Nafiye Güneç KIYAK , 05.02.2010	**Revision Date :**