Course Number : PHYS 103	**Course Title** : Physics Laboratory I
Required / Elective : required	**Pre / Co-requisites :** -
Catalog Description: Experiments on: work and energy; dynamics of system of particles; conservation of energy and momentum, collisions; rotational kinematics and dynamics; equilibrium of rigid bodies; oscillations.	**Textbook / Required Material :** Physics Laboratory Manual, prepared by N. G. Kıyak
Course Structure / Schedule : (0+0+2) 1 / 2 ECTS	
Extended Description : **M1. Measurement:** Basics of measurement and error estimation arising from the measurements. **M2. Error estimation and graphical analysis:** Analysis of measurement errors, and graphical presentation.**M3. The period of simple pendulum:** To find oscillation period of a simple pendulum and to calculate the acceleration due to gravity. **M4. Free fall:** Functional relationship between height of fall and time of fall, to determine the acceleration due to gravity. **M5. Hooke's Law and elastic properties of materials:** Elastic properties of a spring and find the spring constant, to investigate the work done by the spring force. **M6. Vibratory motion of a helical spring:** Period and frequency of a vibratory motion, to investigate the spring constants of helical springs. **M7. Rotational motion and moment of inertia:** Angular acceleration and torque of the motion, to determine the moment of inertia of a wheel. **M8. Conservation of mechanical energy:** Potential energy, to investigate the translational and rotational energy, to determine the mechanical energy of whole system. **M9. Viscosity measurements:** Viscosity coefficient of glycerin, to calculate the terminal speed of the bearings moving through the glycerin. **M10. Elastic properties of a metal and young modulus:** Elastic properties of a metal wire, to determine the Young's Modulus. **M11. Projectile Motion:** Range and maximum height both theoretically and experimentally; the range and maximum height of projection as a function of the angle of inclination; (maximum) range as a function of the initial velocity. **M12. Mechanical Hysteresis:** Hysteresis curve of steel and copper rods; recording the stress-relaxation curve with relaxation times of different materials. **M13. Force of Friction:** Static frictional force; calculation of the coefficient of static friction. **M14. Kinetic Frictional Force:** Kinetic frictional force; calculation of the coefficient of kinetic friction.	
Design content : None	**Computer usage**: Students use computational and graphics software to record and analysis 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 of standard laboratory instruments used in mechanical measurements (11).
2. develop skills in measuring and analyzing physical data (1, 11).
3. learn systematic methods of data collection and data analysis (11).
4. write effective descriptions of work performed and learn to write clear and accurate reporting of results (11).
5. have an ability to work in a team on multi-disciplinary projects (4, 8).
6. learn how to draw conclusions from results and make suggestions for improvement of the experiments (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 of 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 :**