Course Title	**Experimental and Statistical Analysis**
Course Code	**MME105**
Course Purpose and Objectives	This experimental course aims to introduce the students to basic experimental techniques employed for the determination of physical parameters, to the statistical analysis of experimental data, graphical methods for data presentation and to the preparation of laboratory reports.
Course Content	- Introduction in Experimental and Statistical Analysis (error sources, error theory, significant digits, propagation error, introduction in the construction of plots, least square method). - Laboratory Exercises: ΠΙ1: Law of conservation of linear momentum (Newton's 2nd Law) ΠΙ2: Determination of gravitational acceleration (g) using a simple pendulum ΠΙ3: Equation of state/constitutive equation – Hooke's Law ΠΙ4: Conservation of Energy: Torque – Work ΠΙ5: Torque of Parallel and non-parallel forces ΠΙ6: Moment of inertia ΠΙ7: Determination of friction coefficient ΠΙ8: Thermal expansion ΠΙ9: Specific heat capacity ΠΙ10: Boyle's Law ΠΙ11: Charles' law ΠΙ12: Determination of viscosity
Learning Outcomes	- Accurate performance of laboratory experiments and correct acquisition of experimental data - Understanding of the significance of complying with health and safety regulations in laboratories. - Understanding the meaning of "accuracy" and "precision" in experimental measurements - Perfomance of a quality test (Q-test) for the identification and rejection of "suspect" experimental values. - Understanding rounding and significant digits - Understanding on the main sources and categories of experimental errors - Ability to perform statistical analysis and evaluation on experimental data - Understanding of error propagation and solving related problems. - Ability to generate plots from experimental data. - Ability for processing primary experimental data in order to obtain linear plots. - Understanding and use of the least square method - Skill development on the evaluation of the quality of an experiment. - Preparation of well-structured written laboratory reports. - Use of excel software in analyzing experimental data and constructing plots.


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