



Unit of Study Information

Code	Unit	Evaluation Method	Mode	Session options
FI72N	Experimental Physics 1	Grade and Attendance	Presencial	Semestral

Workload					
TC	PC	OA	SPA	PACC	Total
0	2	2	0	0	30
<ul style="list-style-type: none">• TC: Theorethic Classes (per week);• PC: Practical Classes (per week);• OA: Out-of-class Activities (hours per session);• SPA: Supervised Practical Activities (classes per session);• PACC: Practical Activities as Curricular Components (classes per session, included in OA and SPA);• Total: total workload in hours.					

Learning Outcomes																				
Develop experiments involving the phenomena of Newtonian Mechanics, Fluid Mechanics, Wave and Thermodynamics. Introduce the student to the basic methods of obtaining, recording and analyzing experimental data using computational tools, error propagation and technical writing.																				
Syllabus																				
Mechanics Experiments, Fluid Mechanics, Wave and Thermodynamics, Measurement Types and Instruments, Significant Error Theory and Numerals, Instrumental and Random Error, Error Propagation, Experimental Dispersion and Estimates, Gaussian Curve, Small Sample Treatment, Collectind and Registering Data, Tables and Graphs, Computer Usage, Linearization Technique and Least Squares.																				
Content																				
<table><tr><th>Order</th><th>Syllabus</th><th>Content</th></tr><tr><td>1</td><td>Error Theory</td><td>Experiments involving measurement types, general aspects of measurement errors, measurement instruments and significant digits, central data trend measures, data dispersion measurements, experimental estimates, Gaussian curve, small sample approximation, instrumental error and random error, error propagation, data recording in tables and graphs, linearization technique, graphical representation of uncertainties and least squares. Data processing and graphics on the computer.</td></tr><tr><td>2</td><td>Kinematics</td><td>Experiments involving straight motion: speed, acceleration and free fall. Experiments involving three-dimensional motion: Projectile launching and circular motion.</td></tr><tr><td>3</td><td>Dynamics</td><td>Experiments involving Newton's laws, friction, work and energy, energy conservation, rotation dynamics, physical pendulum, harmonic oscillators, waves and stationary.</td></tr><tr><td>4</td><td>Fluids</td><td>Experiments involving pressure, buoyancy, Archimedes principle, viscosity and Bernoulli equation.</td></tr><tr><td>5</td><td>Thermodynamics</td><td>Experiments involving thermal expansion, heat, the laws of thermodynamics and kinetic theory of gases.</td></tr></table>			Order	Syllabus	Content	1	Error Theory	Experiments involving measurement types, general aspects of measurement errors, measurement instruments and significant digits, central data trend measures, data dispersion measurements, experimental estimates, Gaussian curve, small sample approximation, instrumental error and random error, error propagation, data recording in tables and graphs, linearization technique, graphical representation of uncertainties and least squares. Data processing and graphics on the computer.	2	Kinematics	Experiments involving straight motion: speed, acceleration and free fall. Experiments involving three-dimensional motion: Projectile launching and circular motion.	3	Dynamics	Experiments involving Newton's laws, friction, work and energy, energy conservation, rotation dynamics, physical pendulum, harmonic oscillators, waves and stationary.	4	Fluids	Experiments involving pressure, buoyancy, Archimedes principle, viscosity and Bernoulli equation.	5	Thermodynamics	Experiments involving thermal expansion, heat, the laws of thermodynamics and kinetic theory of gases.
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Basic Resources
JURAITIS, Klemensas Rimgaudas; DOMICIANO, João Baptista. Introdução ao laboratório de física experimental: métodos de obtenção, registro e análise de dados experimentais. Londrina, PR: EDUEL, 2009. xvii, 352 p. ISBN 9788572164702.
John R. Taylor “Introdução à Análise de Erros – O estudo de incerteza em medições físicas”, Ed. Bookman, Porto Alegre, 2012.
TIPLER, Paul Allen,; MOSCA, Gene. Física: para cientistas e engenheiros. 6. ed. Rio de Janeiro, RJ: LTC, c2009. 3 v. ISBN 9788521617105 (v.1).

Aditonal Resources
HALLIDAY, David; RESNICK, Robert; WALKER, Jearl. Fundamentos de física. 8. ed. Rio de Janeiro, RJ: LTC, c2009. 4 v. ISBN 9788521616054 (v.1). - vol. 1
BALBINOT, A.; BRUSAMARELLO, J. V. Instrumentação e Fundamentos de Medidas - Vol. 1, 2ª edição. [Minha Biblioteca]. Retirado de https://integrada.minhabiblioteca.com.br/#/books/978-85-216-1921-5/
SERWAY, Raymond A. Física para cientistas e engenheiros com física moderna. 3. ed. Rio de Janeiro, RJ: LTC, c1996. 4 v. ISBN 85-216-1075-0 (v. 1).
RAMALHO JÚNIOR, Francisco; FERRARO, Nicolau Gilberto; SOARES, Paulo Antônio de Toledo. Os fundamentos da física. 7. ed. rev. e ampl. São Paulo: Moderna, 1999. 3 v. ISBN 85-16-02274-9 (v.1)
SERWAY, Raymond A.; JEWETT, John W. Princípios de física. São Paulo, SP: Cengage Learning, 2016. v. ISBN 9788522116379 (v.2).