



The version you're consulting is not final. This course description may change. The final version will be published on 1st June.

5.00 credits	22.5 h + 22.5 h	Q1
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Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	LPHYS1221 for the students enrolled in the Bachelor in physics who wish to follow this teaching unit within the additional module in physics. Having followed LPHYS1201 is an asset. No prerequisites for students who have obtained a Bachelor's degree in physics and who therefore already have a basic knowledge of : - circuit theory, - the complex algebra and Laplace transform.
Main themes	This teaching unit is designed to familiarize the student with the basic aspects of analog electronic equipment in modern metrology. It deals with the essential points of linear electronics in semiconductors and small signals, mainly focalized in the study of . Both parts should be followed in parallel and the links between these two parts will be done during practical work and during a personal project.
Learning outcomes	At the end of this learning unit, the student is able to : 1. Contribution of the teaching unit to the learning outcomes of the programme (PHYS2M and PHYS2M1) AA1: A1.1, A1.5 AA2: A2.5 1. Specific learning outcomes of the teaching unit At the end of this teaching unit, the student will be able to : 1. describe the operating mode of the basic electronic, analog components and its limitations ; 2. simulate with LTSPICE software the response of the basic electronic circuits ; 3. analyze and calculate the basic assemblies commonly used in physics in the reading of sensors / detectors ;
Evaluation methods	The evaluation is based on : - laboratory reports (25%). Continuous evaluation; - weekly exercices and assignments. Continuous evaluation (25%) - written exam: 6 questions + 3 problems (50%) ; All three parts should be passed with more than 50% each.
Teaching methods	Lectures and exercises sessions in auditorium : Directed practical work. Analogue electronics (compulsary) : - experimental study of basic circuits ; - LTSPICE simulation of circuits ; - report after each session.
Content	1. Electronic simulation tools LTSpice-IV. 2. Analysis of passive circuits composed of linear and permanent elements. 3. The semiconductor diode. 4. The bipolar transistor. 5. Unipolar transistor or FET with field effect. 6. Differential amplifier. Operational amplifier. 7. Transmission lines. 8. The electronic noise.
Bibliography	1. Electronic Principles, A. Malvino & D.J. Bates, McGraw Hill (2007). 2. Microelectronic circuits, Sedra & Smith, Oxford University Press (2004).

Faculty or entity in charge	PHYS
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Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Additionnal module in Physics	APPHYS	5		
Master [60] in Physics	PHYS2M1	5		
Master [120] in Physics	PHYS2M	5		