


Teacher(s)	Cortina Gil Eduardo ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	The main objective of this teaching unit is to put in contact the student with the fundamental basics of electronics equipment used in modern metrology. Are addressed the essential topics in small signal analogue electronics systems based in semiconductor technologies.
Aims	<p>a. Contribution of the teaching unit to the learning outcomes of the programme (PHYS2MA)</p> <p>1.5, 1.6, 1.7, 2.2, 2.3, 3.4, 4.1, 4.2, 5.1, 6.4</p> <p>b. Specific learning outcomes of the teaching unit</p> <p>At the end of this teaching unit, the student will be able to :</p> <ol style="list-style-type: none"> 1. describe the working modes of the basic electronics components as well as their shortcomings; 2. simulate, with the help of the LTSPICE program, the outcome of simple electronic circuits; 3. put in place and analyze the basic circuits used widely in the readout of captors/detectors used in physical measurements; 4. acquire the basic knowledge to discuss about the functionality of these circuits with electronics engineers designers; 5. understand and recognize the technical specifications of electronic circuits functionalities; 6. read and understand the data sheets of electronic components. <p>-----</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Evaluation methods	<p>The evaluation is done through laboratory reports (20% of final mark) and an exam (40% for the theory part and 40% for the problem part).</p> <p>The theoretical part (1h30) consists in 5 or 6 questions.</p> <p>For the problems part (2h), 3 questions are proposed. During this part, the student can consult any documentation: lectures notes, books, computer, etc.;</p> <p>Examples of questions and problems from previous years are available in the online platform and some of them are presented and solved during the lectures.</p>
Teaching methods	<p>This teaching unit has two main activities:</p> <ol style="list-style-type: none"> 1. Theoretical lectures and exercises sessions <ul style="list-style-type: none"> - Lectures in auditorium - Problem solving in auditorium 2. Laboratory <ul style="list-style-type: none"> - Experimental study of basic circuits - LTSPICE simulation of those circuits - Reports expected after each session (20% of the final mark) <p>All materials (syllabus, slides, exercises, previous year exercises, lab notes, data sheets of electronic components, simulation program tutorials) can be found on MoodleUCL website of the teaching unit: http://moodleucl.uclouvain.be/course/view.php?id=7718.</p>
Content	<ol style="list-style-type: none"> 1. Simulation tools in electronics: LTSpice-IV. 2. Passive circuit analysis: linear and permanent electronic components. 3. Semiconductor diodes. 4. Bipolar transistors. 5. Unipolar transistors or Field Effect Transistors (FET). 6. Differential amplifier. Operational amplifier. 7. Transmission lines. 8. Electronic noise

Bibliography	Electronic Principles, A. Malvino, D.J. Bates, McGraw Hill (2007). Introduction a l'Electronique Linéaire, R. Prieels, Syllabus (1997). The Art of Electronics, P. Horowitz, W. Hill, Cambridge University Press (1989). Microelectronic Circuits, Sedra, Smith, Oxford University Press (2004). Electronics and Communications for Scientist and Engineers, Martin Plonus, Harcourt Academic Press (2001).
Faculty or entity in charge	PHYS

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Physics	PHYS2M	5		
Additional module in Physics	LPHYS100P	5		