

BACHELOR 'S PROGRAMME
1st YEAR OF STUDY, 1st SEMESTER

COURSE TITLE	ELECTRONICS
COURSE CODE	
COURSE TYPE	full attendance
COURSE LEVEL	1 st cycle (bachelor's degree)
YEAR OF STUDY, SEMESTER	1 st year of study, 1 st semester
NUMBER OF ECTS CREDITS	5
NUMBER OF HOURS PER WEEK	7 (3 lecture hours + 4 seminar hours)
NAME OF LECTURE HOLDER	Lect. Phd. Ovidiu Gabriel Avădănei
NAME OF SEMINAR HOLDER	Lect. Phd. Ovidiu Gabriel Avădănei
PREREQUISITES	Advanced level of English
A	GENERAL AND COURSE-SPECIFIC COMPETENCES
	<p>General competences:</p> <ul style="list-style-type: none"> → Realization of a project/ team activity and identification of specific professional roles. → Elaboration of a specialty or licence work, respecting the objectives, proposed deadlines and norms of professional ethics. <p>Course-specific competences:</p> <ul style="list-style-type: none"> → Derivation of working formulas for calculations with physical quantities using appropriate principles and laws of Physics. → Description of physical systems, using specific theories and tools (experimental and theoretical models, algorithms, schemes, etc.) → Application of the principles and laws of Physics in solving theoretical or practical problems, under qualified assistance conditions. → Correct application of methods of analysis and of criteria for choosing the appropriate solutions to achieve the specified performances. → Proper use of numerical methods and mathematical statistics in the analysis and processing of specific physical data → Elaboration of graphs and reports for explaining and interpreting physical results obtained by statistical methods. → Correlation of statistical analysis methods on a given topic (realization of measurements/calculations, data processing, interpretation). → Assessing the reliability of the results and comparing them with bibliographical data or calculated theoretical values, using statistical validation methods and/ or numerical methods. → Application of Physics knowledge both in given situations in related fields and in experiments, using standard laboratory equipment. → Explanation and interpretation of physical phenomena by formulating assumptions and operationalizing key concepts and proper use of laboratory equipment. → Critical assesment of the results obtained by employing a physical model, including the degree of uncertainty of the obtained experimental results. → Proper use in professional communication of the terminology specific to Physics but also to related domains (especially Mathematics) → Responsible performing independent work tasks and interdisciplinary approach of topics.
B	LEARNING OUTCOMES
	<p>At the end of the study the students must have the folowing competences:</p> <ul style="list-style-type: none"> • To be capable to explain the functioning principles, the structure and the applications of the studied electronic circuits. • To characterise the electronic devices and circuits using the laboratory equipments. • To design experimental configurations using the .available measurements equipements, and to identify the supplementary equipements needed to be acquired in order to made the required measurements.
C	LECTURE CONTENT
	<p>Introduction to the discipline. Passive components, their role and importance in electronic devices. Energy bands in solid materials. Charge Carriers Concentration and Energy Distribution in Solids, Fermi Level. Basic equations in semiconductor electronics.</p> <p>The junction pn. Semiconductor diodes. Polarization of pn junction, ideal diode equation. Types of diodes, features, uses.</p> <p>Bipolar transistors, operation, current expressions, static characteristics. Measurement of transistors, fundamental mounting circuits, loads characteristic and operating point.</p> <p>Field effect transistors with junction gate (TECJ) and field effect (TEC); structure, operation, current expressions, main parameters, static characteristics, fundamental mountings, applications.</p>

	<p>Amplification. The negative reaction. Types of amplifiers. Operational Amplifiers. Main features. Fundamental motions. Apps. Instrument Amplifier Isolation Amplifier. Generating Analog Signals. Signals and numerical circuits. Switching circuits. Voltage comparators. Analog-numerical conversion. Data acquisition and processing systems</p>
D	RECOMMENDED READING FOR LECTURES
	<ol style="list-style-type: none"> 1. D.D.Sandu "Electronica fizică si aplicată", Vol.I, Editura Univ. "Al.I.Cuza", Iasi,1994 2. Fl.M.Tufescu,"Dispozitive și circuite electronice" partea I, Edit.Univ.Al.I.Cuza" Iași 2002 3. Fl.M.Tufescu,"Dispozitive și circuite electronice" partea 2, Edit.Univ.Al.I.Cuza" Iași 2005 4. http://home.uaic.ro/~ftufescu/ 5. Bernard Grehant, "Physique des semiconducteurs", Eyrolles Paris ,1987 6. V.M.Cătuneanu (coord) "Materiale pentru electronică", Ed.did.și ped.București 1982 7. G.I.Epifanov, "Solid State Physics", Mir Publishers, 1979 8. Dumitru D. Sandu, "Electronica fizică" Ed.Academiei , București 1973 9. Dumitru D.Sandu, "Dispozitive și circuite electronice",Editura did.și ped.Buc.1975 10. M.Sze, "Physics of Semiconductor Devices", J.Wiley and Sons, NY,1969 11. Al.Nicula, "Fizica semiconductorilor și aplicații", Ed Did. și ped., București 1975. 12. D.Dascălu, ș.a. "Dispozitive și circuite electronice" Ed.did și ped. București 1982. 13. S.Nan, I.Munteanu, Gh.Băluță, "Dispozitive fotonice cu semiconductori", Ed. Tehnică, București,1986 E.Damachi ș.a., "Electronica", Ed.did și ped.Buc.1979 14. O.G.Avadanei, Fl.M.Tufescu, „Electronica , Culegere de probleme” , Edit.Univ,“Al.I.Cuza”, Iasi,2008
E	SEMINAR CONTENT
	<p>RLC circuits Conduction in semiconductors PN jonction and applications Bipolar transistor polarisation circuits JFET transistor polarisation circuits Amplifier circuits Oscilators Operational Amplifiers Voltage comparators Evaluation Presentation of the electronic equipment used in the laboratory. Safe work in electrical and electronic domain. Semiconductor diodes. Static characteristics and main diode parameters. AC-DC convertors with Semiconductor diodes. DC current filtration. Voltage stabilizers. Parameter stabilizer with zener diode. Bipolar transistor, static characteristics, parameter determination. Polarization circuits for the bipolar transistor. Field effect transistor, static characteristics, parameter determination Low Frequency Amplifier with Bipolar Transistor (TB). Low Frequency Amplifier with Field Transistor. Operational Amplifiers, Fundamental Circuits. RC and LC Sine wave oscillators. The astable, monostable, and flip-flop circuits. Recovery and completion of laboratory work. Laboratory colloquy</p>
F	RECOMMENDED READING FOR SEMINARS
	<ol style="list-style-type: none"> 1. Florin Mihai Tufescu, Electronica fizica Îndrumar de lucrări practice, Editura Univerității Alexandru Ioan Cuza Iași 2003 2. Dispozitive și circuite electronice II. Editura Univerității Alexandru Ioan Cuza Iași 3. http://home.uaic.ro/~ftufescu/3.
G	EDUCATION STYLE
LEARNING AND TEACHING METHODS	Lecture, Debate and Guided Discovery, Problem solving, Guided Experiment
ASSESSMENT METHODS	<ul style="list-style-type: none"> • Written and oral exam: 50% of which 25% theoretical part and 25% problems. • Assessment of the first 7 courses during the semester: 25% • Requirements required to promote discipline: • For each sample, the grade is ≥ 5. • All laboratory work should be performed in its entirety. • There is a minimum of 20 presentations at the course and seminar.

	<ul style="list-style-type: none">• Laboratory activity:• 10% Workshop presentation and interpretation.• 15% Colloquium from laboratory work
LANGUAGE OF INSTRUCTION	English