



### ADVANCED ELECTRONICS

<b>Enrollment year</b>	2020/2021
<b>Academic year</b>	2021/2022
<b>Regulations</b>	DM270
<b>Academic discipline</b>	ING-INF/01 (ELECTRONICS)
<b>Department</b>	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
<b>Course</b>	ELECTRICAL ENGINEERING
<b>Curriculum</b>	PERCORSO COMUNE
<b>Year of study</b>	2°
<b>Period</b>	2nd semester (07/03/2022 - 17/06/2022)
<b>ECTS</b>	3
<b>Lesson hours</b>	23 lesson hours
<b>Language</b>	Italian
<b>Activity type</b>	ORAL TEST
<b>Teacher</b>	ANNOVAZZI LODI VALERIO (titolare) - 3 ECTS
<b>Prerequisites</b>	Knowledge of basic electronic devices and circuits: operational amplifiers, diodes, FETs, MOS-FETs and their analog applications. This course represents the completion of the module Elettronica (Electronics) of the course Elettronica per Ingegneria Industriale (Electronics for Industrial Engineering), to which it specifically refers.
<b>Learning outcomes</b>	To complete the basic skills acquired by the module of electronics ('Elettronica') of the three-year Degree in Industrial Engineering, with the addition of topics such as: the BJT, feedback, power amplification stages, selected two-element active stages, the precision rectifier.
<b>Course contents</b>	Complements on operational amplifiers The super diode. The precision single and double half-wave rectifier. Logarithmic and antilogarithmic amplifiers. Current generators.

The BJT transistor  
Physics of the BJT. Modes of operation. Polarization networks. Small signal circuit model. Basic single-stage BJT circuits. Multi-stage amplifiers. Cascode amplifier, Darlington amplifier, differential pair. The current mirror. Active loads. Applications.

Feedback in electronic amplifiers  
Classification of feedback circuits. Stability. Effects of feedback. Examples of circuits with feedback.

Power amplification stages  
Definition and classification of output stages for power amplifiers. Class A amplifiers. Class B and class AB amplifiers. Efficiency. Polarization circuits.

Optoelectronics  
Photodetectors and applications.

**Teaching methods**

The course includes classroom lessons where the theory of active elements and electronic circuits of the course is developed; classroom exercises where numerical examples are performed on analysis and synthesis of amplifiers and signal processing circuits with discrete elements and operational amplifiers

**Reccomended or required readings**

A.Sedra, K.Smith. Microelectronic Circuits, III or newer ed. Oxford University Press.

**Assessment methods**

Oral exam to evaluate the candidate skills on the topics included in the course programme,  
The final score is out of thirty.

**Further information**

**Sustainable development goals - Agenda 2030**

[The goals](#)