



ELECTRONICS ENGINEERING FUNDAMENTALS—18749		
BACHELOR IN INDUSTRIAL ELECTRONICS AND AUTOMATION ENGINEERING	YEAR: 2nd	TERM: 2nd

TOPIC 1. Electronic signals and systems

- Block diagram of real electronic systems and subsystems.
- Designing and building-up an electronic system. Main requirements.
- Electronic signal types and their parameters that describe them.
 - Magnitude, period, frequency.
 - RMS and mean values.
- Review of electric circuit analysis and basic circuit theory.
 - Kirchhoff's laws
 - Thevenin and Norton
- RC and CR filters. Capacitor's charge and discharge equations.

TOPIC 2. Electronic instrumentation. Sensors and transducers

- Lab instrumentation and measurement of electronic signals.
 - Hands-on in lab instruments.
 - Measuring basic parameters on electronic signals.
- Electronic sensors. Classification.
- Transducers. Classification.

TOPIC 3. Amplifiers and analog electronic subsystems

- Description and modeling.
 - Power and Gain.
 - Distortion
- Concept of transfer function. Classification.
- Operational amplifiers.
 - Comparators.
 - Negative feedback. Applications.
- Software for analog circuit simulation.

TOPIC 4. Electronic components and integrated circuits

- Diodes: description, operation and applications.
 - PN junction and characteristic curves of a diode.
 - Clipping and rectifier circuits.
 - Applications in power sources.
- Transistors: description, operation and applications.
 - MOSFET: working zones

BJT: working zones

Biasing transistors

Their use in analog and digital electronics.

Small signal amplifiers

Small signal concept

Common emitter and source amplifiers

Other types of amplifiers: pros and cons.

- Moore's Law and integrated electronic circuits manufacturing.

TOPIC 5. Digital electronic subsystems and analog-to-digital (A/D) and digital-to-analog (D/A) conversion

- Fundamentals of digital electronics.

Numbering and coding in digital systems.

Boolean algebra.

Basic logic gates.

Boolean logic functions and representation.

- Combinational and sequential digital circuits.

- A/D and D/A converters. Characteristics.

TOPIC 6. Small signal amplifiers

- Small signal models.

- Possible configurations.

- Configurations analysis and their applications.

- Integrated Circuits amplifiers.

LAB SESSIONS:

Laboratory sessions working both digital and analog electronics fundamentals and measurement techniques for electronic circuits.