



Project No.
8004-EC

Date
2025

Doc. No.
EOTSS8004

Serial No
8004/2025

Rev.
00

Proj. dep.
Electronic

EOTSS Doc. CODE :

EOTSS/CIVIL/8004-EC/2025



المكتب الهندسي لخدمات التكنولوجيا والبرمجيات

Engineering office for Technology and Software Services

Analog Electronics

Analog Electronics Course

1. Course Introduction

This course covers fundamental and advanced concepts in analog electronics, including circuit analysis, design, and the operation of components like transistors, amplifiers, and analog filters.

2. Course Objectives

- ✓ Understand the basic principles of analog electronics
- ✓ Analyze and design analog circuits.
- ✓ Learn about key components such as transistors and operational amplifiers. (Op-Amps)

3. Target Audience

Engineering students
(Electrical/Electronics)

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technician getech-
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4. Course Content

Module 1
Introduction to Analog Electronics

- ✓ Basic and basic coliponics (Resistors, capacitors, inductors diodes)
- ✓ Circuit Laws (Ohm's Law, Kirckfloff's Laws)

Module 2
Introduction to solutionindrc

- ✓ Operation and types of diodes
- ✓ Applicatiess of buides noenifiers, voltage regul-ators, clip

Module 5
Analog Filters

- ✓ Low-pass anad signal gain
- ✓ Band-pass and hith-stop Fitters
- ✓ Designing filters using Op-Amps

Module 5
Signal Generators and Modulation

- ✓ Analog excillators (RC, LC, and crystal excillators)
- ✓ Signal modulation techniques (MM, FM)
- ✓ Applications of signall generators

5. Prerequisites

Basic knowledge of electrical circuits
Fundamentals of physics (electricity and magnetiom)
No prior electronics experiencured

8. Course Outcomes

- ✓ Analyze and design various analog circuits
- ✓ Select appropriate components for analog projects
- ✓ Understand the working of Op-Amps, filters, and signal generators
- ✓ Apply knowledge to reat-world projects.
- ✓ Analyze and design vousical anaio projects

6. Course Duration

40 hours, spread over 8 weeks (5 hours perweek)

Code: 8004-EC



Analog Electronics Course



1. Course Introduction

This course covers fundamental and advanced concepts in **analog electronics**, including circuit analysis, design, and the operation of components like **transistors, amplifiers, and analog filters**.

Main Branch: United building – E Shams –Front NBE
El Siouf _Alexandria

Tel: 01102060500-01144470856



الفرع الرئيسي : عمارات المتحدة – عمارة عين شمس – امام البنك
الاھلي – السيوف- الاسكندرية

تليفون: 01102060500 - 01144470856

E-mail. adelramadan@eotss-academy.com
info@eotss-academy.com





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2. Course Objectives

- ✓ Understand the basic principles of analog electronics.
- ✓ Analyze and design analog circuits.
- ✓ Learn about key components such as transistors and **operational amplifiers (Op-Amps)**.
- ✓ Apply analog circuits in **real-world projects**.



3. Target Audience

- 👤 **Engineering students** (Electrical/Electronics).
- 🔧 **Engineers and technicians** working in electronics.
- 🧑‍🔧 **Hobbyists** interested in learning analog electronics.



4. Course Content



Module 1: Introduction to Analog Electronics



Difference between **analog and digital electronics**.



Basic components (**resistors, capacitors, inductors, diodes**).



Circuit laws (**Ohm's Law, Kirchhoff's Laws**).



Module 2: Semiconductors and Diodes



Introduction to **semiconductors**.



Operation and **types of diodes**.



Applications of diodes (**rectifiers, voltage regulators, clippers**).



Module 3: Transistors (BJT & MOSFET)



Structure and operation of **Bipolar Junction Transistors (BJT)**.



Transistor as a **switch and amplifier**.



MOSFET operation and applications.



Module 4: Analog Amplifiers



Concept of **amplification and signal gain**.



Class **A, B, AB, and C transistor amplifiers**.



Operational amplifiers (Op-Amps) and their practical applications.



Module 5: Analog Filters



Low-pass and high-pass filters.



Band-pass and band-stop filters.



Designing filters using Op-Amps.



Module 6: Signal Generators and Modulation

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-  Analog oscillators (RC, LC, and crystal oscillators).
-  Signal modulation techniques (AM, FM).
-  Applications of signal generators.
-  **Module 7: Power Supplies and Voltage Regulators**
-  Linear vs. switching regulators.
-  Unregulated and regulated power supplies.
-  Practical applications of voltage regulation circuits.
-  **Module 8: Practical Applications and Projects**
-  Designing and building an analog audio amplifier.
-  Implementing an active filter using Op-Amps.
-  Final project integrating multiple analog components.






5. Prerequisites

-  Basic knowledge of electrical circuits.
-  Fundamentals of physics (electricity and magnetism).
-  No prior electronics experience is required.





6. Course Duration

-  40 hours spread over 8 weeks (5 hours per week).

7. Required Tools & Equipment

-  Laboratory power supply.
-  Signal generator.
-  Multimeter.
-  Oscilloscope.
-  Electronic components (transistors, resistors, capacitors, Op-Amps).

8. Course Outcomes

-  Analyze and design various analog circuits.
-  Select appropriate components for analog projects.
-  Understand the working of Op-Amps, filters, and signal generators.
-  Apply knowledge to real-world projects.

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