

INTRODUCTION

Electrotechnics is a field dedicated to the generation, transmission, conversion, and utilization of electrical energy – the very foundation of modern industry and technology. Within this domain, the study of **electrotechnical materials** plays a pivotal role in understanding how matter interacts with electricity and magnetism to enable innovation and performance.

This module explores the essential classes of materials used in electrotechnical engineering, namely **conductors, semiconductors, magnetic materials, dielectric materials, and superconductors**. Each category will be examined through its physical, chemical, and mechanical properties, linking theory to real-world applications in energy systems, electrical machines, and electronic devices.

Designed for **third-year undergraduate students in Electrical Engineering** at *Mohamed Boudiaf University of M'sila*, this course aims to guide learners from the fundamental concepts of material science toward advanced notions commonly used in industrial and research settings.

The module is not meant to be exhaustive; rather, it provides a structured foundation that encourages critical thinking, experimentation, and curiosity. Students are invited to engage actively, raise questions, and consult the recommended references for deeper understanding.

Beyond academic objectives, this course seeks to **bridge scientific principles with engineering practice**, nurturing an appreciation for the materials that shape our electrical world. Whether you aim to specialize in power systems, electronics, or emerging superconducting technologies, this module offers a vital step in mastering the materials that make modern electrotechnics possible.