

Introduction to Electrical Engineering

Introduction to Electrical Engineering Technology

Key concepts, typical tasks, and career pathways

1. What Is Electrical Engineering Technology (EET)?

Aspect	Electrical Engineering (EE)	Electrical Engineering Technology (EET)
Focus	Theory, advanced mathematics, and design of new concepts	Application of EE principles, implementation, testing, and maintenance
Typical Work	Developing novel circuits, algorithms, and systems	Building, installing, troubleshooting, and optimizing existing systems
Education	Bachelor's (often 4-year) with strong math/physics	Associate's (2-year) or Bachelor's (3-4 year) with hands-on labs
Career Entry	Design engineer, research engineer	Field/service engineer, test technician, systems integrator

2. Core Subjects & Skills

Subject Area	Core Topics	Practical Skills Gained
Circuit Theory	Ohm's law, Kirchhoff's laws, AC/DC analysis, Thevenin/Norton equivalents	Build and analyze real-world circuits on breadboards and PCBs
Digital Logic	Boolean algebra, combinational & sequential logic, microcontrollers	Program microcontrollers (e.g., Arduino, PIC), design logic gates
Electronics	Diodes, transistors (BJT, MOSFET), op-amps, power electronics	Solder components, design power supplies, create amplifiers
Power Systems	Generation, transmission, distribution, transformers, protective devices	Perform load calculations, install wiring, conduct fault analysis
Instrumentation & Measurement	Sensors, transducers, multimeters, oscilloscopes, data acquisition	Calibrate instruments, acquire & interpret data
Control Systems	Feedback, PID control, PLC programming, motor drives	Program PLCs, tune controllers, integrate motor control circuits

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Subject Area	Core Topics	Practical Skills Gained
Communications	Analog/digital modulation, RF basics, networking fundamentals	Set up and troubleshoot wired/wireless networks, test signal integrity
Safety & Codes	NEC, IEC standards, lockout/tagout, grounding, PPE	Conduct safety audits, ensure compliance with regulations

3. Typical Work Environments

Setting	Typical Tasks	Example Industries
Manufacturing Plant	Install/maintain production line equipment, troubleshoot PLCs, perform preventive maintenance	Automotive, consumer electronics, food processing
Construction Site	Wire buildings, install lighting & power distribution, test grounding systems	Commercial construction, renewable energy (solar, wind)
R&D Lab	Build prototype circuits, test new components, document results	Electronics OEMs, medical device firms
Field Service	Diagnose equipment failures on-site, replace faulty parts, calibrate instruments	HVAC, industrial automation, telecommunications
Utilities	Monitor substations, perform line inspections, manage outage restoration	Power generation & distribution, smart grid projects

4. Laboratory & Hands-On Experience

Lab Type	Core Activities	Tools & Equipment
Electronics Lab	Soldering, circuit simulation, PCB layout	Soldering iron, PCB design software (e.g., KiCad), multimeter, oscilloscope
Power Lab	Build transformers, test motor drives, measure power factor	Variable AC source, power analyzer, clamp meter
Control Lab	Program PLCs, design H-bridge motor drivers, implement PID loops	PLC trainer kits, ladder logic software, motor test bench
Communication Lab	Set up Ethernet, test RF modules	