



Universidad
Tecnológica
de Pereira

Faculty of Engineering

Electrical Engineering

SNIES CODE: 270

Qualified registration:

Res. N ° 08083/17 May 2018, Validity 7 years

High quality registration:

Res. N ° 11956/16 June 2016, Validity 6 years



Generates electrical energy for social sustainable development

Studies the application of electricity, electronics,
and electromagnetism.

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Pereira - Colombia





Electrical Engineering

About us

We are pioneers in Colombia! Our program was born out of a national need to diversify the economy, especially in the industrial sector. We started in 1961, as the first program of the Technological University of Pereira.

In the year 2000, the National Ministry of Education recognized our trajectory with the High-Quality Accreditation. Currently, we have spaces for learning and research such as specialized laboratories, software licenses, and the virtual subscription to the databases of IEEE, Springer, and ScienceDirect, as well as a specialized library, among others.

Título:	Electrical Engineering
Duración del programa:	10 semesters
Admission:	Biannual
SNIES code:	270
Qualified registration:	Res. N ° 11109/11 September 2012, Validity 7 years
High quality registration:	Res. N ° 11956/16 June 2016 Validity 6 years

Our Objective

The Technological University of Pereira and the Program of Electrical Engineering share an institutional identity based on the premise that the integral professional education is beyond of specific curricular contents, but is part of the academic life, and implies educational practices such as critical thinking, education for citizenship, democracy, and commitment to environmental sustainability.

Based on this, the objectives of the program are:

1. To train professionals capable of interpreting the phenomena in which electrical energy intervenes, which makes possible the planning, generation, transmission, maintenance, and use of such energy in a safe, efficient, economic, and sustainable manner.
2. To train professionals of a high academic level, with knowledge in power systems, automatic control, and power electronics. Professionals that are competent, analytical and able to solve problems, manage projects, establish effective communication with the technical and

academic community, with a high sense of ethical and professional responsibility to make efficient and rational use of resources.

3. To promote research and continuous study in our alumni, such that they learn how to stay close to the state-of-the-art, and to promote autonomous and critical thinking that allows for the identification of problems and formulation of possible solution alternatives.

4. To educate citizens with high ethical values, solidarity, critical thinking, creative and flexible minds, with personal and social responsibility, with the capacity to act individually and collectively, in order to influence the social reality.

5. To educate professionals in a context of social coexistence based on reason, equality, discussion, and permanent criticism. This is thanks to the emphasis on citizen education and democracy, which is the only framework that makes possible the free and autonomous development of people, which implies forming creative, innovative and trained people to act in a globalized world.

Our Mission

We focus our work on the development and dissemination of scientific knowledge in the fields of electrical energy, electronics, and communications. With our highly qualified professors, we promote research, continuous education, and the projection to the community, contributing to the scientific, technological, cultural, and humanistic development of society.

Our Vision

Our vision is to be recognized as a solid program in the region and the country, by forming leading professionals in the field of the electrical engineering, with solid backgrounds and state-of-the-art techniques, in order to contribute to the sustainable development of society.



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Faculty of Engineering - UTP
Electrical Engineering
Building N° 1B

Graduate Profile

The Electrical Engineer of the Technological University of Pereira is able to perform tasks that involve the analysis, planning, design, construction, operation, and maintenance for systems involving generation, transmission, distribution, and the final use of electrical energy. Throughout their training, our students will also acquire skills that allow them to apply automation and communications tools, control theory, electronics, and measurements and instrumentation into electrical energy systems.

Given the strengths of the Electrical Engineering department, represented on the high quality of its professors and research groups, future electrical engineers are competent in areas such as planning, operation, management, control, regulation, quality and reliability of electrical systems. Furthermore, the program allows the student to adapt to emerging concepts related to electric power systems such as smart grids, new transmission technologies, diversification of the energy mix and renewable energies as well as environmental sustainability. In addition, the graduate of the program stands out at the national level for his knowledge in mathematical optimization, a subject with significant advancement.

Learning Outcomes

The program has learning outcomes (LO) oriented to the development of a professional that is able to respond to the increasingly complex field of electrical engineering, in areas such as design, implementation, planning, operation, management, and maintenance. The learning outcomes are formulated in the form of competencies of the graduates in accordance with the Educational Program Project (EPP) and the institutional guidelines based on national standards, the graduated profile, the needs of the environment and the society. The learning outcomes planned for the program are:

LO-1: To design equipment to power, protect, and control electrical systems. To design measurement and control systems for the monitoring and automation of processes considering economic, environmental and social aspects.

LO-2: To design and build medium and high voltage networks, monitoring and automation systems, as well as electrical installations taking into account environmental, social and economic restrictions.

LO-3: To schedule and perform the maintenance of the power, protection and control equipment of electrical systems, as well as equipment involved in industrial processes.

LO-4: Planning of medium and high voltage networks by modeling the electric power system, considering studies of demand projection, load flows and optimization.

LO-5: To operate power, protection and control equipment for power generation plants, rotating electrical machines and transformers.

LO-6: To model electrical systems considering national and international standardization, making use of the theory of electrical circuits, electromagnetic theory and advanced mathematical techniques.

LO-7: To implement software and hardware through new technologies, to improve the competitiveness and efficiency of industrial processes.

LO-8: To apply strategies that promote research capacity and its application, supported by Information and Communication Technologies (ICT), that allow autonomy for the identification of engineering problems and solutions.

LO-9: To execute activities of administration and control of electrical projects, or for companies in the electricity sector.

LO-10: To apply management principles to participate in different levels of a company.

LO-11: To act with ethics, responsibility, respect for ideas and differences, tolerance and solidarity, in an environment of adequate social coexistence built on ethical, and social values.

LO-12: To work as a team with qualities of leadership, communication, and negotiation.

LO-13: To listen, speak and write effectively in a second language.

LO-14: To apply effectively the language to support oral and written communication, and adequate reading and writing skills.

LO-15: To recognize the importance of updating and deepening knowledge, thus fostering permanent and continuous professional development.

LO-16: To analyze and evaluate problematic situations in a specific context.

LO-17: To solve problems by applying the laws and procedures of the natural sciences and mathematics.

What do you need to be part of the program?

You must understand basic concepts in physics and mathematics in order to start a process of engineering training, to have good writing and reading skills, to have a creative and investigative spirit, to possess critical thinking, a willingness to self-learn, availability for teamwork, respect for others, responsibility, ethics and social solidarity.

Universidad Tecnológica de Pereira
Reacreditada como Institución de Alta Calidad
por el Ministerio de Educación Nacional
2013 - 2021



Electrical Engineering

Curriculum

SEMESTER	Course	AC
1º Semester	•Oral and Written Expression •Humanities I •Mathematics I (differential calculus) •Introduction to Electrical Engineering •Fundamentals of Chemistry and Biology	2 2 5 2 3
2º Semester	•Mathematics II (integral calculus) •Physics I •Linear Algebra •Physics Laboratory I •Elective on Humanities and Social Sciences I •Energy, Environment, and Development	5 3 4 2 2 2
3º Semester	•Mathematics III •Physics II •Physics Laboratory II •Elective on Humanities and Social Sciences II •Algorithms and Computer Programming •Technical drawing for engineering •Legislation, Ethics, and Labor law	4 4 2 2 3 2 2
4º Semester	•Mathematics IV •Physics III •Physics Laboratory III •Numerical Methods and Programming •Elective on Humanities and Social Sciences III •Electromagnetism I •Fundamentals of Mechanics	3 4 2 3 2 3 3
5º Semester	•Statistics and Probability •Electrical Circuits I •Electrical Power Generation •Electromagnetism II •Digital Electronics •Introduction to management	3 4 3 3 3 2
6º Semester	•Electrical Circuits Laboratory I •Rotating Electrical Machines •Electrical Circuits II •Analog Electronics •Linear Systems •Formulation and Evaluation of Projects	2 3 3 3 3 3

CA Academic Credits

SEMESTRE	ASIGNATURA	CA
7º Semester	•Power Electronics •Electrical Installations and Lighting •Electrical Circuits Laboratory II •Transformers •Electrical Power Transmission System •Analog and Digital Electronics Laboratory •Signal Analysis	3 3 2 3 3 2 3
8º Semester	•Measurements and Instrumentation •Machines Laboratory •Control Systems •Power Electronics Laboratory •Graduation seminar •Power Systems Analysis •Electrical Power Distribution Systems	3 2 3 2 2 3 3
9º Semester	•Protection of Power Systems •Stability of Electrical Systems •Industrial Automation •Electrical Maintenance •Elective on special topic I •Elective for graduation -Master's program courses or -formative research or -industrial internship	3 3 3 3 3 4
10º Semester	•Operation of Electrical Systems •Power Systems Laboratory •Industrial Automation Laboratory •Measurements and Instrumentation Laboratory •Elective on special topic II	3 2 2 2 3

Total Number of courses: 82 / Total Number of credits: 174

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Faculty of Engineering - UTP
Electrical Engineering
Building N° 1B

Layout: Computing and Educational Resources CRIE
CRIE - UTP - Tels: 313 7140

For more information about the program

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Registration

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