Freistaat Thüringen

Electrical engineering and electronics.

A powerful engine for Thuringia's industry.

Areas of expertise:

- Actuators, drives and nano-positioning systems
- Firmware and software technology
- Information and communications technology
- Microelectronics
- Optoelectronics
- Polytronics
- Circuits and power electronics
- Sensors and instrumentation

Applications/target industries:

- Automotive
- Energy
- Building automation
- Aerospace
- Medical devices and bioinstruments
- Measurement and control systems
- Telecommunications
- Optical industry
- Personal computers

Source: Thuringian State Statistical Office, 2019 figures

Nanolithography, LTCC multilayer technology, silicon technology, quantum sensors and ultrashort pulse laser technologies – these innovations represent a mere cross-section of the kind of advanced electrical engineering produced in Thuringia. Global players such as Bosch, Jenoptik and Melexis research tomorrow's solutions here.

The industry at a glance:

- 230 companies
- Approx. 25,000 employees
- EUR 5 billion in revenue
- Around 14,500 engineering students
- Attractive customers, suppliers and research institutions located nearby (in optics, IT, medical devices, etc.)
- Central location is ideal for providing a wide range of on-site services

Seize the opportunities that Thuringia offers

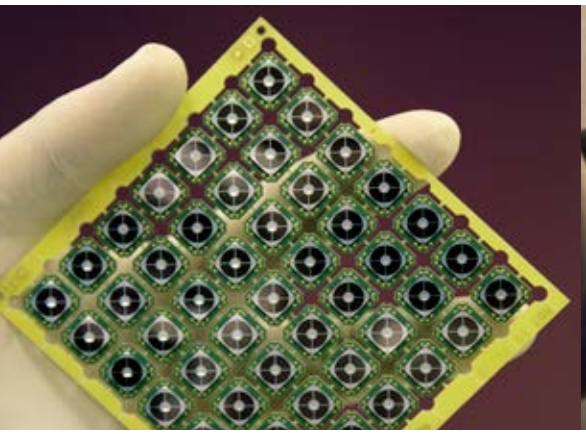
Capitalize on its excellent research infrastructure, highly skilled workers and central location in Europe.

We provide full-service support for any investment project – from site searches to implementation to your future business operations in Thuringia. Contact us today.

@ www.invest-in-thuringia.de/en/industries-technologies/electrical-engineering

Internationally renowned top-flight research.

Thuringia's research institutes are world leaders in developing intelligent electrical engineering applications. As cutting-edge research findings emerge, they are quickly shared with companies through close ties between the local scientific and business communities.



Selected research institutes:

- CiS - Research Institute for Micro Sensors, Erfurt
- Fraunhofer Institute for Applied Optics and Precision Engineering (IOF), Jena
- Fraunhofer Institute for Ceramic Technologies and Systems (IKTS), Hermsdorf
- Advanced System Technology (AST) Branch of Fraunhofer IOSB of the Fraunhofer Institute of Optronics, System Technologies and Image Exploitation, Ilmenau
- Günther Köhler Institute of Joining Technology and Materials Testing (ifw), Jena
- Institute for Microelectronic and Mechatronic Systems (IMMS), Ilmenau
- Leibniz Institute of Photonic Technology (IPHT), Jena
- Innovation Center for Quantum Optics and Sensing (InQuoSens), Ilmenau
- Center for Micro and Nanotechnologies (ZMN Ilmenau)

Growth through cooperation

Thuringia Electronic Measurement and Instrument Engineering (ELMUG) is an industrial cluster that pools the technological capabilities of developers, manufacturers, suppliers and service providers at around 60 companies and 10 research institutions in the measurement and control industry in Thuringia.

The cluster is an especially ideal platform for small and medium-sized industry players. It puts them directly in touch with attractive business partners for joint research, procurement or distribution projects. At the same time, members can share experiences in order to effectively map out the risks and opportunities of future ventures, such as entering foreign markets.

ELMUG expert groups:

- Micro-Nano Integration
- EMC and Device Security
- Digitalization

MNT e.V.

The microsystems and nanotechnology cluster organization aggregates all the activities and expertise in this highly specialized core industry in Thuringia.

Innovation driver for German industry: TU Ilmenau

The Ilmenau University of Technology (TU Ilmenau) is more than a popular institution of higher learning; it is also a world leader in top-flight electrical and IT research. TU Ilmenau received a TopUni2020 award in the university ranking conducted by StudyCheck, a rating portal. The university actively supports transfers of knowledge, technology and personnel to companies. Scientific research is consistently tailored to clients' needs. A dedicated technology scout and transfer center enables effective project management from initial ideas to marketable products.

At InQuoSens, research into quantum optics, quantum computing and industrial sensors is conducted by the Institute of Micro and Nanotechnologies (IMN MacroNano®) at TU Ilmenau and the Abbe Center of Photonics (ACP) at FSU Jena. This partnership makes it possible to cover the entire scientific process chain.

www.tu-ilmenau.de/forschung

Motivated and highly skilled workers.

Thuringia owes its status as an electrical engineering powerhouse not only to the wide range of degree programs at local universities, but also to its highly trained workforce – from mechatronics technicians to precision opticians.

University education

Thuringian technical universities carry on the region's long engineering tradition with considerable success. They are among Germany's best educational institutions. All the universities offer world-class training in fields such as:

- **Electrical engineering, information technology, automation:**
  University of Applied Sciences Jena, University of Applied Sciences Nordhausen, University of Applied Sciences Schmalkalden, Ilmenau University of Technology, Eisenach/Gera University of Cooperative Education
- **Laser and opto technologies, photonics, optronics:**
  Ernst Abbe University of Applied Sciences Jena, Friedrich Schiller University of Jena, Ilmenau University of Technology
- **Micro and nanotechnologies, mechatronics:**
  Ernst Abbe University of Applied Sciences Jena, Ilmenau University of Technology
- **Building and energy technology, renewable energy, electrical power and control engineering:**
  University of Applied Sciences Erfurt, University of Applied Sciences Nordhausen, Ilmenau University of Technology
- **Space electronics:**
  Ernst Abbe University of Applied Sciences Jena

Degree programs are also available in applied information technology, technical information technology, engineering information technology and other fields.

"From space for Earth: Products and technologies from Thuringia play key roles in space missions that are as spectacular as they are pioneering. Our success depends on our unique mixture of tradition and innovation as well as the broad-based cooperative environment encompassing local institutions, universities and companies."

Peter Kapell, Managing Director of Jena-Optronik GmbH

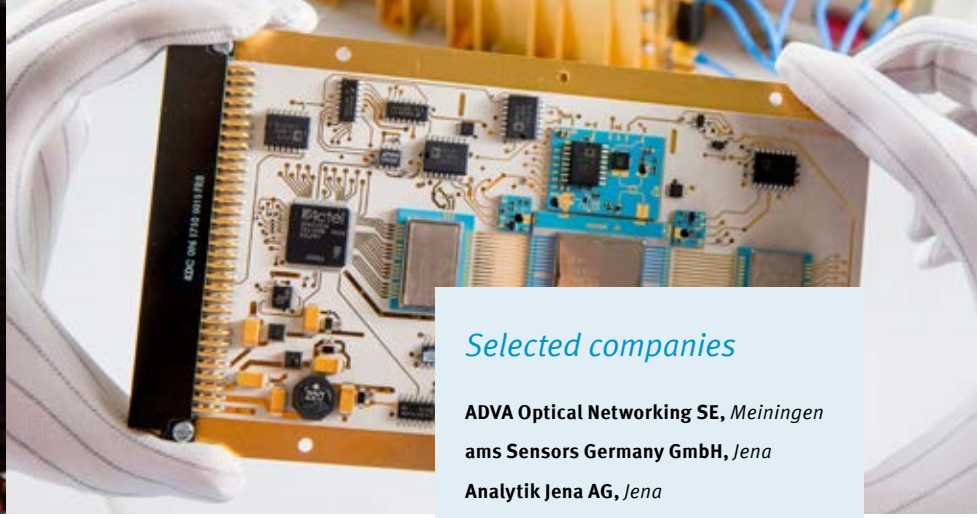
Vocational training and continuing education

In Thuringia, tomorrow's specialists complete a rigorous course of theoretical and practical training. These and many other programs cover the entire electrical and electronic value chain:

- **Electronics technician**
  Specializations: Energy and building systems, automation systems, machines and drives, etc.
- **IT electronics technician**
- **Mechatronics technician**
- **Microtechnologist**
- **Physics laboratory assistant**
- **Precision optician/engineer**

Training associations raise the quality of education even more. The Jena Training Center, for example – a joint venture of Schott, Carl Zeiss and Jenoptik – produces highly trained specialists for many industry players.

TU Ilmenau offers special continuing education programs such as a major in light application.



Thuringia: where success is made.

Thuringia offers outstanding growth opportunities for companies seeking to make a splash in the market with new electrical applications or cutting-edge electronics. Major market and technology leaders have been doing business in Thuringia for many years.

GÖPEL electronic GmbH
Jena-based GÖPEL electronic is a leading provider of electrical and optical testing and inspection systems. Founded in 1991, the company currently has over 200 employees in addition to the approx. 300 more specialists in its worldwide distribution and service network. GÖPEL was named one of Germany's 100 best medium-sized enterprises as part of the TOP JOB Program. Its products have won several coveted awards in recent years.

Jena-Optronik GmbH
The Jena-based sensor manufacturer's slogan is "From Jena to Mars". Customers trust the Thuringian aerospace company's rugged, high-precision position control sensors, rendezvous and docking sensors and optic subsystems for space-based applications.

SIOS Messtechnik GmbH
Established in 1991, SIOS Messtechnik GmbH is an innovative developer and manufacturer of high-precision, high-quality laser interferometry instruments. The products it makes at its Ilmenau headquarters include the NMM-1 – a laser interferometric nano-positioning and nano-measurement machine.

X-FAB Semiconductor Foundries GmbH
The X-FAB Group is an Erfurt-based multinational semiconductor foundry that produces silicon wafers. Since 1992, the chip manufacturer has invested a nine-digit sum in new equipment and state-of-the-art infrastructure at its Erfurt location, where it now employs around 800 people.

Selected companies

ADVA Optical Networking SE, *Meiningen*

ams Sensors Germany GmbH, *Jena*

Analytik Jena AG, *Jena*

Antennentechnik Bad Blankenburg GmbH, *Weimar*

Carl Zeiss Microscopy GmbH, *Jena*

EPSa Elektronik & Präzisionsbau Saalfeld GmbH, *Saalfeld*

Fujitsu Technology Solutions GmbH, *Sömmerda*

Funkwerk AG, *Kölleda*

JENOPTIK AG, *Jena*

Lüberg Elektronik GmbH, *Sonneberg*

Marquardt Lightronics GmbH, *Arnstadt*

Melexis GmbH, *Erfurt*

Micro-Hybrid Electronic GmbH, *Hermsdorf*

Micro-Sensys GmbH, *Erfurt*

MTM Power Messtechnik Mellenbach GmbH, *Mellenbach*

paragon AG, *Suhl*

PI Ceramic GmbH, *Lederhose*

Qundis GmbH, *Erfurt*

Rheinmetall Electronics GmbH, *Jena*

rmw Kabelsysteme GmbH, *Crossen*

Robert Bosch Battery Solutions GmbH, *Eisenach*

Scanfil Electronics GmbH, *Wutha-Farnroda*

Schaeffler Industrial Drives AG & Co. KG, *Suhl*

Thales Deutschland GmbH, *Arnstadt*

UST Umweltsensortechnik GmbH, *Geschwenda*

VIA Electronic, *Hermsdorf*

Vision & Control GmbH, *Suhl*

Vistec Electron Beam GmbH, *Jena*

WAGO Kontakttechnik GmbH & Co. KG, *Sondershausen*

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Our consulting services are free. Simply set an appointment with our experienced investor service team.

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