



Research Fields

- Semiconductor Optics
- Semiconductor Device Engineering
- Quantum Functional Device Engineering
- Sensors and Systems Engineering
- Advanced Functional Materials and Devices
- Superconductivity and Thin Film Engineering
- Electronics and Physics
- Plasma Energy Engineering
- System Measurement Engineering
- Power Electronics
- Control Information Engineering
- Communication Device Engineering
- Electromagnetic Wave Device Engineering

Electrical and Electronic Engineering

How do we live in modern societies without electricity? We cannot imagine a life without electricity. If we had no electrical energy, which we call “power” in Electrical and Electronic Engineering, we could not use mobile phones, computers or the internet. We could not get water and gas delivered to us without power. Thus, modern societies are maintained by Electrical and Electronic Engineering. Electrical and Electronic Engineering is categorized into three technological fields: Electronics, Control Systems Engineering and Power Engineering.

Magnetic materials, large scale integrated circuits (LSIs), semiconductor devices and dielectric materials are included in Electronics. A gallium-nitride (GaN) based light emitting diode (LED) is now one of the most famous electronic devices in the world.

This GaN LED is also included in the field of Electronics. Equally well known is robot technology, a field of Control Systems Engineering. Control Systems Engineering also covers sensing of mechanical and electric quantities. These sensors are used in our daily life in everything from medical equipment to factories and cars.

Information technologies (ITs), computers and mobile phones are also included in the control systems engineering in Electrical and Electronics Engineering. Power Engineering covers generation, transmission, and distribution with electronic converters using semiconductors.

Electric machines, generators, motors and transformers, and transformers require power engineering. Synchronous AC generators are used to generate power in hydroelectric, fire and nuclear power plants. Electric vehicles (EVs) and the Nozomi bullet-trains are driven by AC motors, where inverters with insulated gate bipolar transistors (IGBTs) are used. Inverters with IGBTs are widely used in renewable energy generation systems, including photovoltaic (PV) generation systems and wind turbines.

Next generation engineers continue to research and pursue creative new technologies. In order to do this and be successful a basic understanding of Electrical engineering is indispensable. The mission of our department is to produce highly-qualified, well-rounded, and

motivated graduates who possess a fundamental knowledge of electrical and electronic engineering and who can provide leadership and service to Yamaguchi, Japan, and the world. Thus, this department provides our students with well-balanced majors in three technological fields related to Electrical and Electronic Engineering.

Every year, many companies in every kind of industry extend job offers to graduates from our department. The electrical, electric utility, automobile, chemical, and construction industries are some of the many industries in which our graduates are now employed.



Semiconductor Crystal Growth Apparatus for GaN LEDs