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BATTERY SCIENCE AND ENGINEERING

Battery Science and Engineering is a program that is based on knowledge in the fields of Materials Science and Nanotechnology Engineering, Mechatronics Engineering, Electronics Engineering and Computer Science and Engineering, and addresses energy storage, one of the most important problems of today and the future. Therefore, we strongly recommend that our students studying in the fields mentioned above apply to the Battery Science and Engineering Minor Program.

. Sabancı .
Universitesi

Why Battery Technology Matters

Today's Necessity, Tomorrow's Revolution & Carbon-free life for Earth and New Generations

Batteries are at the heart of our modern technology, from powering electric appliances and vehicles to serving as essential components in energy storage systems. As we shift towards renewable energy, the demand for efficient, sustainable battery solutions continues to soar, where the battery production capacity is expected to see a 10-fold increase by 2030.

Join Our Cutting-Edge Battery Science & Engineering Minor Program

COMPREHENSIVE CURRICULUM

Our minor program offers a well-rounded education in battery science and engineering, integrating theoretical knowledge with practical experience. The curriculum core classes:

- **Battery Science and Engineering:** Fundamentals of electrochemical processes, materials science, thermodynamics, and engineering applications.
- **Cell Design, Modeling & Battery Pack Development:** Cell design principles and fabrication methods, performance analysis and modelling techniques, principles of battery pack design, electrical architecture, structural and thermal modeling, and safety.
- **Battery Management Systems:** Design and implementation of BMS for electric vehicles and energy storage, focusing on hardware, software, thermal management, and safety.
- **Power Electronics:** Application of power semiconductor devices for efficient energy conversion, covering circuit and signal analysis, switching power converters, and control algorithms.
- **Electrochemistry:** Comprehensive introduction to fundamentals of electrochemistry, modern electrochemical methods and applications of electrochemistry
- **Thermodynamics:** Fundamental concepts and mathematical tools, laws of thermodynamics, thermal equilibrium; equations of state, thermodynamic potentials, the Maxwell relations; first order phase transitions
- **Advanced Materials Characterization:** Basic overview and general aspects of electronic and crystal properties of solid materials; dynamic light scattering; atomic force microscopy; electron spin resonance spectroscopy, solid state nuclear magnetic resonance spectroscopy; Mössbauer spectroscopy, dielectric spectroscopy and impedance spectroscopy.

INDUSTRY COLLABORATION

Siro Energy and Sabancı University come together for a c.l.e.a.n.® future.

Gain invaluable experience through our partnership with Siro Energy. This collaboration ensures that students are exposed to the latest industry practices & technologies, bridging the gap between academia, industry & private sector.

Why Choose This Minor?

- **Be at the Forefront of Technological Innovation:** Partake in the development of next-generation battery technologies and sustainable energy solutions in electric vehicles and beyond.
- **Cutting-Edge Facilities:** Engage in real-world projects that provide practical experience in state-of-the-art labs equipped with the latest tools and technologies in battery science.
- **High Demand for Expertise:** With the growing emphasis on renewable energy and electric vehicles, the need for expertise in battery technology is highly sought after globally, with an increase of 30% annually over the next decade.
- **Lucrative Careers:** Battery engineers are among the highest-paid professionals in engineering. They often find themselves in top 20% of salary range for all engineering disciplines, with top earners in the field ranking in top 10%.

Get Involved

- **Esteemed Instructors:** Learn from distinguished academia and expert professionals who are leaders in the field of battery science and engineering.
- **Projects and Internships:** Engage in exciting real-life projects and internships with our industry partners, providing a gateway to future career opportunities.

Start Your Journey Today!

Visit Us at the Battery Science and Engineering booth: Learn more about our program, meet the faculty, and discover how you can become a part of the future of energy.