

Department of Applied Physics

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What is Physics?

The purpose of physics is to explore the laws of nature, to understand diverse natural phenomena on the basis of these laws, and to explain and predict new phenomena. Modern physics, including the theory of relativity and quantum mechanics, increase human knowledge of nature and lead modern science and technology in diverse fields such as semiconductor electronics, nanotechnologies, new material development, energy-related technology, and photonics. Recent advances in nanotechnology have made it possible to apply the quantum mechanics to the information technology, opening new fields such as quantum computation, quantum sensing, and quantum teleportation.

Physics and Applied Physics at Kyung Hee University

The Physics Department was founded in the College of Science and Engineering at the Suwon campus in 1980. In 1999, it became the Physics and Applied Physics major in the School of Electronics and Information, and it returned to the independent department, as the Department of Applied Physics again in 2009. Promising technologies such as nanostructures, memory and non-memory semi-conductors, advanced/energy-related materials, applied optics, and quantum information have been chosen as areas of specialization, and practical education facilities have been established to provide training programs at the undergraduate level. In the field of nanostructures and semiconductors, we undertake research into the processing, modification and characterization of electronic and optoelectronic materials, and into the design, fabrication and testing of novel electronic and optoelectronic devices. Applied optics, an increasingly important field for all optical telecommunication networks, is also one of our specialized research areas. Most recently, we has opened a course for quantum information, introducing the quantum algorithms and applications in the undergraduate level, together with experimental realization of the quantum technology. Currently we have twelve faculty members performing joint theoretical/experimental collaboration in the fields of nanostructures, semiconductors, new energy-related materials, optical devices, and quantum information. The Quantum Information Research group was selected for the Brain Korea 21 plus Grant of 3-year graduate school research supported by the Ministry of Education.

| Degree Requirements |

To receive the Bachelor of Science in Physics and Applied Physics, a student must

- complete a minimum of 130 credit units
- satisfy the general requirements of the School for professional degrees
- complete 14 units of required courses
- complete 67 units of technical electives for Applied Physics
- complete 35 units(maximum 56 units) stated in the common studies program and Humanities/Social Science Electives

| Courses |

Year 1

Calculus, Advanced Calculus, Physics I,II, Physical Experiment I,II

Year 2

Mechanics, Electromagnetism I, Introduction to Modern Physics, Mathematical Physics I,II, Introduction for Electronics and Circuits, Introduction to Photonics, Semiconductor Physics, Quantum Physics and Quantum Information, Experiments in Modern Physics, Photonics Experiments

Year 3

Electromagnetism II, Quantum Mechanics I,II, Quantum Computing, Thermodynamics and Statistical Physics, Fourier Optics, Condensed Matter Physics I, Photonics Devices, Applications of Quantum Information, Computational Physics I,II, Semiconductor Devices, Electronic Circuit Experiments, Experiments for Quantum Information

Year 4

Photonics Design, Condensed Matter Physics II, Quantum Information Hardware, Semiconductor Fabrication Process, Nanoscience and Technology, Experiment for Semiconductor Properties and Fabrication, Applied Physics Seminars I,II

| Careers and Graduate Destinations |

Our students can take a job in most of semiconductor electronics and optics companies or become a physics teacher. We strongly recommend students entering a physics graduate program to have special knowledge and capability for advanced researches. With a graduate degree, students can be welcomed by leading electronics companies or research laboratories.

| Faculty |

- ___ Ho-Sun Lee, Ph.D. University of Illinois, Urbana-Champaign, 1993, Professor, Semiconductor Physics, hlee@khu.ac.kr
- ___ Dae-Young Lim, Ph.D. University of Texas at Austin, 2001, Professor, Semiconductor Physics, dlim@khu.ac.kr
- ___ Minchul Lee, Ph.D. Seoul National University, 2003, Professor, Condensed Matter Theory, minchul.lee@khu.ac.kr
- ___ Jong-Soo Lee, Ph.D. Gwangju Institute of Science and Technology, 2005, Professor, Energy-Related and Magnetic Material Experiment, jsrhyee@khu.ac.kr
- ___ Jong-Yeog Son, Ph.D. Pusan National University, 2004, Professor, Semiconductor Thin-film and Nano-structure Experiment, jyson@khu.ac.kr
- ___ Hyunwook Song, Ph.D. Gwangju Institute of Science and Technology, 2011, Professor, Molecular Electronics and Nano-structure-based Sensing Devices Experiment, hsong@khu.ac.kr
- ___ Kwang Jo Lee, Ph.D. Korea Advanced Institute of Science and Technology, 2008, Professor, Non-linear Optics and Photonic Devices Experiment, kjlee88@khu.ac.kr
- ___ Sun Kyung Kim, Ph.D. Korea Advanced Institute of Science and Technology, 2006, Professor, Nanoscale Functioning Optoelectronic Devices Experiment, sunkim@khu.ac.kr
- ___ Sung-Hoon Lee, Ph.D. Pohang University of Science and Technology, 1999, Associate Professor, Theoretical condensed matter physics, lsh@khu.ac.kr
- ___ Kyoung-Ho Kim, Ph.D. Korea University, 2014, Associate Professor, Nano-Photonics and Nano-Optical Devices, kyoungho@khu.ac.kr
- ___ Kyusung Hwang, Ph.D. University of Toronto, 2016, Associate Professor, Topological Quantum Matter Theory, kyusung.hwang@khu.ac.kr
- ___ Healin Im, Ph.D. Sungkyunkwan University, 2021, Assistant Professor, 2D Materials and Next-Generation Semiconductor, ihl0102@khu.ac.kr