

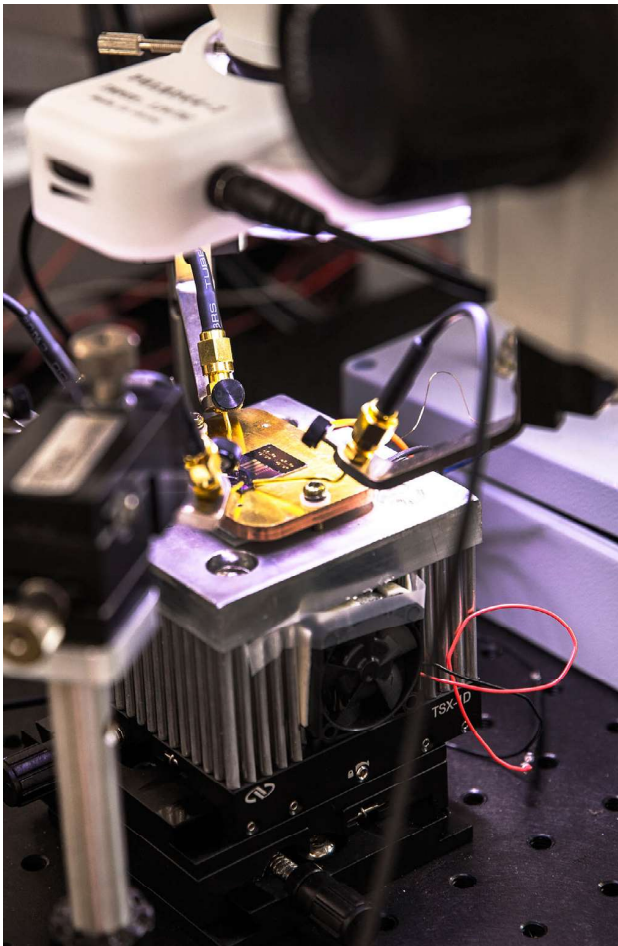
Academic Programs



College of Engineering

1. Department of Mechanical Engineering

Mechanical engineering is the backbone of core industries, including machinery, automobiles, ships, steel, and robotics. At UNIST's Department of Mechanical Engineering and Graduate School, we strive to develop future leaders who can drive the advancement of interdisciplinary technologies in addition to traditional mechanical engineering fields. We cover cutting-edge topics such as advanced energy engineering, future transportation technologies, automation and robotics for human convenience, precision micro/nano-technology, complex multiphysics system analysis, and futuristic bio-machine systems. Our faculty is composed of experts in their fields who are dedicated to providing our students with an outstanding education. We offer state-of-the-art facilities and laboratories that allow our students to gain hands-on experience and apply their knowledge to real-world problems. At UNIST's Department of Mechanical Engineering and Graduate School, we are committed to fostering a community of innovative and creative thinkers who will shape the future of engineering and make a positive impact on society.



Research Fields

- Future Manufacturing and Design Technology
- Thermal, Fluidic and Bio Technology
- Robotics and Autonomous Systems
- Next-generation Composites and Mechanics Technology

Homepage

<http://me.unist.ac.kr/>

2. Department of Civil, Urban, Earth, and Environmental Engineering

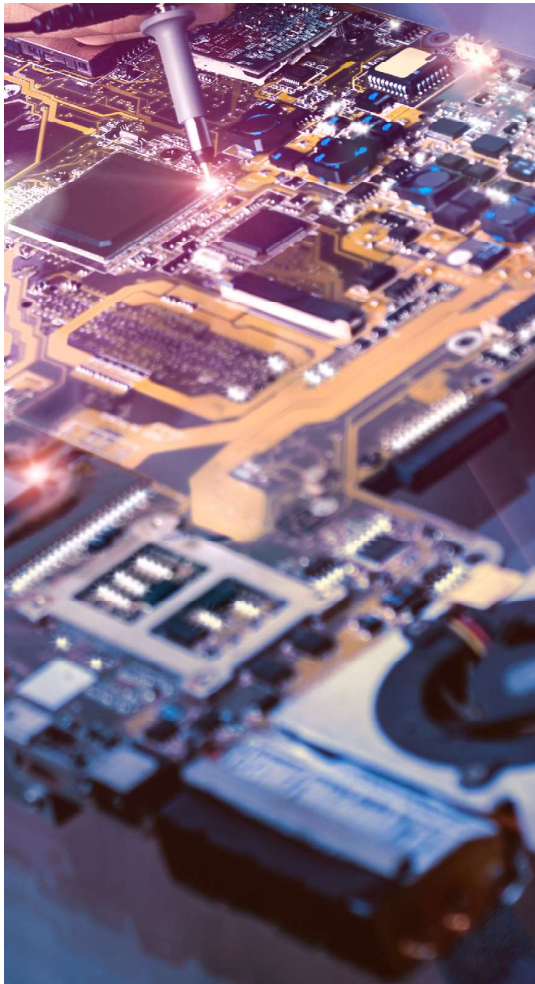
Civil, Urban, Earth, and Environmental Engineering is an interdisciplinary field of study that is dedicated to education and research on the resilient protection of natural and built environments against disasters, as well as the sustainable development of urban society. In this field, the students will learn fundamental knowledge associated with urban and environmental issues, and will explore advanced courses categorized into four major programs: (1) Environmental Science and Engineering, (2) Urban Infrastructure Engineering, (3) Disaster Management Engineering and (4) Water Energy Nexus. The Department of Civil, Urban, Earth, and Environmental Engineering at UNIST is committed to developing innovative technologies in the related fields and cultivating future leaders who will make a huge impact on our profession and society.

Research Fields

- Environmental Science and Engineering
- Urban Infrastructure Engineering
- Disaster Management Engineering

Homepage

<http://uee.unist.ac.kr/>



3. Graduate School of Semiconductor Materials and Devices Engineering

The Graduate School of Semiconductor Materials and Devices Engineering is a highly interdisciplinary graduate program at Ulsan National Institute of Science and Engineering (UNIST) aiming at educating talents in semiconductor materials, devices, processing and equipments. As internationally recognized, UNIST has shown top-tier research capabilities in materials science and engineering, so this new graduate program will be bringing additional academic curriculum and research activities to the campus and offer the world-class research programs in the fields of 1) Next-generation semiconductor materials, 2) Future display materials, and 3) Characterization of semiconductor materials/devices.

Research Fields

- Next-generation Semiconductor Materials
- Future Display Materials
- Characterization of Semiconductor Materials/Devices

Homepage

<http://se.unist.ac.kr/>

4. Department of Materials Science and Engineering

The Department of Materials Science and Engineering is committed to nurturing the next generation of leaders through an interdisciplinary approach to research and education, paving the way for cutting-edge technologies with a profound understanding of materials. Our research and education philosophy is rooted in a balanced focus on both theoretical knowledge and practical application across all material classes, including metals, ceramics, polymers, and composites, with particular emphasis on emerging fields such as next-generation semiconductor materials and advanced materials science. Our community members are trained to think innovatively and tackle challenges in a creative and impactful manner. We are confident that our graduates will be well-equipped to provide society with ground breaking engineering solutions that address contemporary material issues.

Research Fields

- Semiconductors beyond Silicon
- Next-generation materials for IoT and AI-semiconductors
- Energy harvesting materials for carbon neutrality
- Innovative materials for extreme environments

Homepage

<http://mse.unist.ac.kr/>

5. School of Energy and Chemical Engineering

Energy Engineering provides exciting and unique opportunities that deal with production, conversion, storage, and efficiency of energy, and alternative energy technologies from a basic concept to practical technology. We combine courses from chemistry, electrochemistry, polymer, ceramics, physics, and materials engineering to create a strong knowledge essential to success in energy-related areas. Students have the opportunity to take courses and research focused on specific energy research subjects that includes solar cell, fuel cell, battery, and other energy-related devices and materials. Along with research activities, students will be well-prepared for career focused on energy science and engineering and creatively apply their knowledge to confront the global challenges of energy supply and demand.

Battery Science and Technology provides students with a sound basic and practical engineering knowledge-base overlaid with established and emerging battery technology learning through in-depth discussions and laboratory experiments. We focus on the application of scientific principles to design and fabricate novel next generation battery system, which is a key aspect of today's green technology such as portable electronics, electric vehicles, and 'smart grid' power distribution. In order to make significant breakthrough in battery technology, we also make a good effort to understand scientific phenomena such as charge and ion transport and crystallographic transition of materials based on the fundamental electrochemistry and solid state chemistry. Studying a graduate program of Battery Science and Technology at UNIST offers students a firm professional basis in both of academia and industry.

Chemical Engineering aims to be a world-leader. Regarded as one of the finest institution in Korea, this school provides its graduate students with a state-of-the-art research environment and facilities. We focus on the application of Chemical engineering to a variety of specific areas, including energy and the environment, catalysis, reaction engineering, systems and process design, nanotechnology, polymers and colloids and biotechnology. It is a multi-scale engineering school in which students can learn about the creative design of new chemicals, materials, processes and systems by translating molecular level information into novel engineering principles. Faculty members are involved in cutting-edge research programs that encompasses all areas of Chemical engineering: Nanoscience, Materials Science, Catalysis, Electronic Materials and Devices, Colloidal Science and Chemical Engineering. The graduate students and post doctoral researchers will have access to state-of-the-art facilities on campus, such as the UCRF and Chemical Sciences Facility.

Research Fields

- Solar cell
- Energy Materials
- Catalysts
- Materials/Devices
- Biorefinery
- Modeling and Simulations
- Battery Science and Technology

Homepage

<http://eche.unist.ac.kr/>

6. Graduate School of Carbon Neutrality

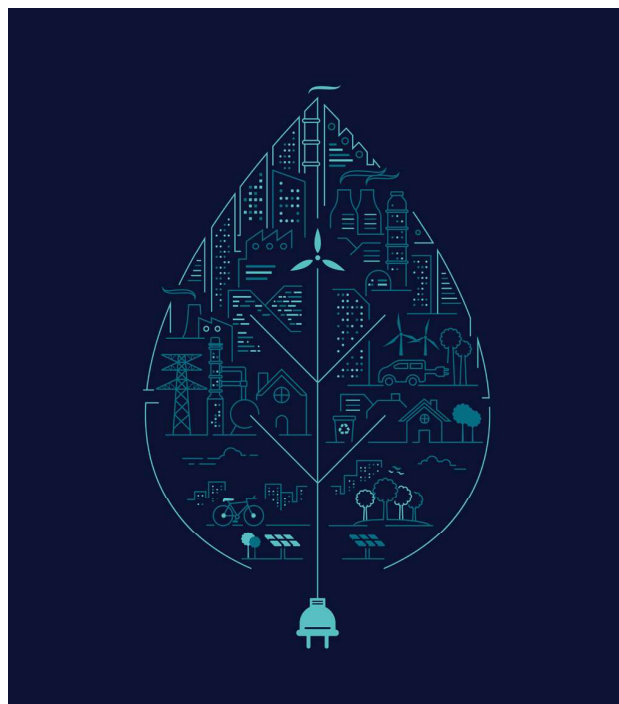
UNIST Graduate School of Carbon Neutrality is aiming at cultivating talents of science and technology to realize 2050 carbon neutrality, and offers various interdisciplinary education and research programs including carbon capture/utilization/storage (CCUS), hydrogen production/storage/transportation (PST), new and renewable energy, and environmental managing policy.

Research Fields

- CCUS (Carbon Capture, Utilization, and Storage)
- Hydrogen Production, Storage, and Transportation
- Renewable Energy, Solar cell
- ESG(Environmental, Social, Governance) Management, Environmental Management

Homepage

<http://cn.unist.ac.kr/>



7. Department of Nuclear Engineering

Department of Nuclear Engineering currently comprises of ten research laboratories: each lab focuses on their unique research themes, including, but not limited to, reactor physics and innovative core design, nuclear power plant (NPP) decontamination and decommissioning (D&D), corrosion behavior of nuclear reactor materials, design and safety analysis of next generation NPP systems, accident-tolerant fuel (ATF) design and radiation-resistant material development, advanced fuel cycle applicable for next generation reactors with much less concern on nuclear proliferation, NPP risk assessment and autonomous operation, high accuracy high speed plasma simulations in fusion reactor such as Korea superconducting Tokamak advanced research or KSTAR. Recently, we brought the two next big things to our department: one is the 'research center for NPP decommissioning technology development' and the other is 'Micro Nuclear Energy Research and Virtual Arena (MINERVA)', also a research center for Micro Modular Reactor (MMR) development for naval applications, such as ice-breakers and submarines. We are standing at the cutting-edge of nuclear engineering research and technology development in our country and will keep leading the Korean nuclear society to a certain extent, in friendly cooperation with many other entities in the society, which will be the future work places for our students and researchers.

Research Fields

- Nuclear Reactor Physics
- Thermal-Hydraulic & Reactor Safety
- Nuclear Fuel
- Nuclear Materials
- Nuclear Fuel Cycle
- Radiation Engineering

Homepage

<http://nuclear.unist.ac.kr/>

College of Information and Biotechnology

8. Department of Design

Situated within one of Korea's prestigious national institutes of science and technology, UNIST Design nurtures professionals and researchers capable of leading the field and shaping the future of design and technology. You will acquire design knowledge and skills in intensive courses, as well as work in a lab to conduct rigorous academic research and solve real-world problems with SMEs, companies, public-sector organizations, and research institutions. Find out more about your future professors and labs on the website.

The masters program of UNIST Design is geared towards sharpening both practical design capabilities and research skills, while Ph.D program focuses on academic research. As a department, UNIST Design boasts faculty members with the most diverse areas of expertise in Korea including design theory, product design and engineering, human-computer interaction (HCI), user experience and interface (UX/UI) design, service design. Therefore you can pursue to carry out research in one or more of those areas.

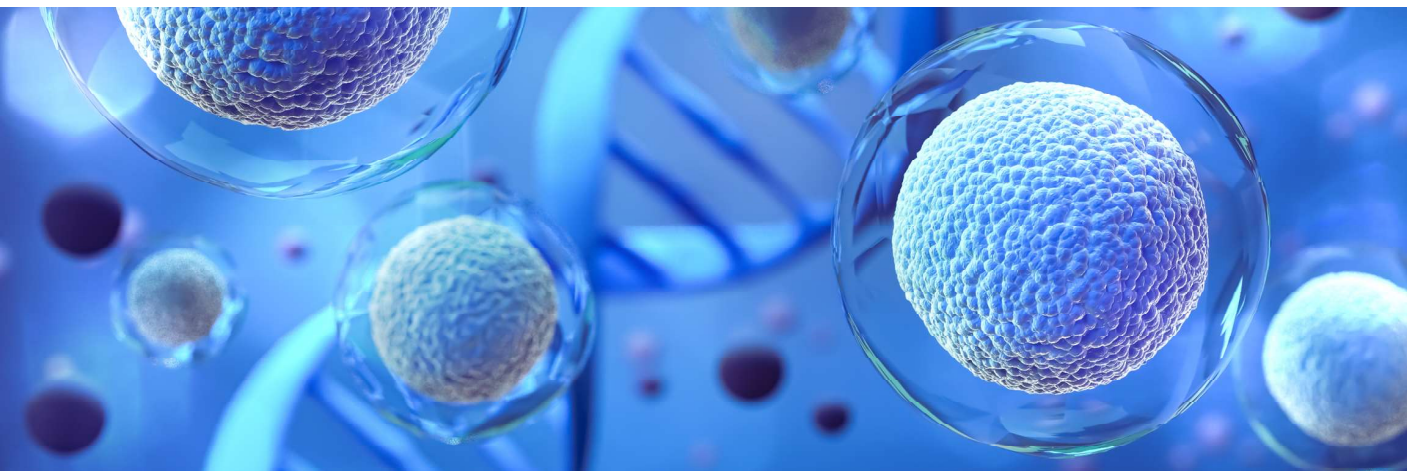
Research Fields

- Design Theory
- Product Design and Engineering
- Human-Computer Interaction (HCI)
- User Experience and Interface (UX/UI) Design
- Service Design.

Homepage

<http://design.unist.ac.kr/>





9. Department of Biomedical Engineering

The Graduate Program of Biomedical Engineering (BME) offers interdisciplinary research and education opportunities across engineering, medicine, and life sciences, to develop technologies that make our society healthier. The program pursues the convergence between various science and engineering subjects while allowing students to develop practical research methods and problem-solving skills through in-depth discussion and practice on each research topic. BME faculties have done world-renowned research in biomedical imaging, brain & cognitive engineering, rehabilitation & regenerative engineering, personalized diagnosis & treatment, genomics and bioinformatics, and digital healthcare. Our graduate program is designed to help students grow into global leaders in both academia and the industry of biomedical engineering.

Research Fields

- Biomedical Imaging
- Brain and Cognitive Engineering
- Rehabilitation and Regenerative Engineering
- Precision Diagnosis and Treatment
- Genomics and Bioinformatics
- Digital Healthcare

Homepage

<http://bme.unist.ac.kr/>

10. Graduate School of Health Science and Technology

Medicine, traditionally based on the life sciences, is progressively integrating with artificial intelligence, data science, biomedical engineering, and others, moving towards the era of smart precision medicine. The Graduate School of Health Science and Technology, opening in 2023, is planning research in sync with these changes in collaboration with various departments within the College of Information and Biotechnology and, more broadly, within UNIST to create a healthier life for humanity. By utilizing networks with large domestic hospitals, medical schools, and international collaborations, we carry out educational programs and research projects that were impossible under the previous system to promote applications in the health practice and industry by building an innovative environment. We envision a future where ideas from medicine, engineering, and science converge in this integrated environment via dynamic interactions between doctors who understand engineering and engineers who understand medicine, leading to new research sprouting and eventually being practical and industrialized.

Research Fields

- Convergence Medicine based on Engineering
- Translational Medicine
- Smart Healthcare
- Medical Entrepreneurship
- Biomedical Engineering
- Biomedical Data Science
- Clinical Application of Omic Data
- New Drug Development
- Next Generation Cancer Therapy

11. Department of Biological Sciences

The Graduate Department of Biological Sciences offers interdisciplinary research training based on fundamental understandings on living organisms and applied knowledge to medical science in order to improve quality of life.

The department provides world-class research environments for biological and medical sciences, such as a state-of-the-art Animal Research Center, Optical Biomed Imaging Center, Cancer Research Center, and Metabolic Disease Research Center. We aim to produce young, brilliant, and creative scientific minds, with world-class renown by educating them, so they are fully equipped and familiar with the basic knowledge of biological and medical sciences as well as cutting-edge research technologies in the state-of-the-art facilities provided by UNIST.

Research Fields

- Neuroscience
- Cancer Biology
- Metabolism and Inflammation
- Genome Integrity
- Immunology
- Bioinformatics
- Structural Biology
- Microorganisms and Infectious Disease
- Development and Regenerative Medicine.

Homepage

<http://bio.unist.ac.kr/>

12. Department of Industrial Engineering

Department of Industrial Engineering (IE) in UNIST pursues education and research that promote the effectiveness and efficiency of decision-making within the industry based on data. We aim to cultivate the top-notch of data science experts to solve the decision-making problems in various industries such as manufacturing, logistics, energy, healthcare and finance by combining scientific methodologies such as statistical analysis, data mining, machine learning, and deep learning. UNIST IE provides advanced courses for data analysis and optimization as well as industry projects to help you to be equipped with both knowledge and real problem-solving skills.

Most of research conducted in industrial engineering follows the following two steps. First, identify problems in various industries such as manufacturing, logistics, energy, healthcare, and finance. Second, develop quantitative methods based on machine learning and/or optimization to solve the problem.

Research Fields

- Data Science
- Fintech
- Smart Manufacturing
- Smart home
- Chemometrics
- Healthcare/Medicine
- Smart City
- Smart Agriculture
- Logistics

Homepage

<http://ie.unist.ac.kr/>



13. Graduate school of Artificial Intelligence

The Graduate School of Artificial Intelligence (AI) aims to nurture world-class talented students leading the era of the 4th industrial revolution and conduct research from core AI technologies to AI-based convergence (AI+X) applications. We offer a curriculum for the master's and doctoral degree programs specialized in the fields of core AI theories and technologies, AI systems/HW, and AI+X applications for manufacturing, chips, mobility, and healthcare. We also study and develop all aspects of intelligent machines and systems for diverse applications. Our research topics include the architecture of intelligent agents, knowledge representation and automated reasoning, trustworthy AI, causal inference, planning and acting in the real world, AutoML, deep learning, reinforcement learning, natural language processing, computer vision and robotics.

The aim of the Graduate school of Artificial Intelligence(AI) at UNIST is to help Students gain in-depth knowledge as well as hands-on experience of AI via its unique learning opportunities aligned with key AI challenges. To achieve this goal, this school offers a student-led customized AI education program with three concentrations: AI theories, AI systems, and AI applications.

1. The 'AI theories' part focuses on addressing the core challenges of AI such as data efficient AI, reliable AI, and artificial general intelligence
2. The 'AI systems' part help develop skills essential for making efficient hardware and software systems for next-generation AI applications;
3. The 'AI applications' part explores applications of AI with possibilities for making real-world Impact in areas such as manufacturing, mobility, and healthcare.

Research Fields

- AI theories
- AI systems
- AI applications

Homepage

<http://aigs.unist.ac.kr/>

14. Department of Electrical Engineering

Department of Electrical Engineering (EE) of UNIST focuses on various electrical engineering research fields including Electronic and photonic devices, Integrated circuits, Electromagnetics, Power electronics, Communications and networking, Control and robot systems, Signal processing and Artificial intelligence which are essential technologies for future 4th industrial revolution. With more than 20 professional faculty members, many graduate students are participating in global-level researches of all electrical engineering fields. The electronic and photonic device group considers research topics such as CMOS devices, healthcare sensors, optical communications which are fundamental materials/devices for electrical engineering. For the integrated circuit design group, almost all topics for designing efficient and high-performance chips which work as brains of all electrical devices of 5G communications, artificial intelligence systems and internet of things are considered. Our faculties in the electromagnetics research group handle issues for electric signals on all frequency bands such as antenna array technologies, THz future communication technologies, etc. The group of power electronics considers wireless power transfer technologies, power converter designs and all related topics for powering electronic devices and systems. Our research group named communications and networking covers all key technologies for intelligent/future communications and networks which will be used to provide intelligent services such as autonomous driving, AI applications in both wireless and wired manners. The control and robot systems group researches all control and optimization technologies for future mobilities, robot systems, autonomous driving cars which are very promising future IT industries. For the last, the signal processing research group develops key signal and image processing technologies for artificial intelligent systems, medical imaging, 3D vision applications and even for deep learning algorithms. After applying our graduate course, students can participate in very promising and interesting IT research fields which make, change and lead the world. After graduation, students will get opportunities for applying to Samsung, LG electronics, SK hynix and other global companies such as Qualcomm, Google, Apple, etc.

Research Fields

- Communications and Signals
- Circuits and Systems
- Photonics and Electronics
- Electromagnetics and Power
- Computers and Software

Homepage

<http://ee.unist.ac.kr/>

15. Department of Computer Science and Engineering

The field of computer science and engineering deals with the theories and SW/HW technologies that are improving the quality of our lives. From deep learning that is revolutionizing computing to networks that connect everyone and everything and to big data and cloud computing that provide the infrastructure to support the anticipated changes of the future, the Department of Computer Science and Engineering is involved in cutting-edge developments that are happening now and into the future. Our vision is not only to advance the state of the art in emerging SW/HW technologies which will benefit humankind, but also to raise future global leaders who can innovate and create new software industries in Korea and worldwide. Our graduate program focuses on cultivating the finest researchers that have the ability of conducting highly creative and innovative research and creating high-quality computing solutions.

Data science focuses on various fields of computer applications including analysis and extraction of information. Thanks to the explosive development of computer system design technology, IT technologies such as e-business, data mining, next-generation web technology, cybersecurity and information protection are used almost everywhere throughout life. In this field, UNIST is studying artificial neural networks, machine learning, human computer interaction (HCI), computer vision, computer graphics, information extraction, and natural language processing.

Computer architecture and system software are the cornerstones of all computer-related research, and the field of study aims to design high-performance systems that are highly scalable, reliable, and cost-effective. UNIST studies embedded systems, computer structures, parallel and distributed processing, real-time systems, operating systems, databases, programming languages, virtual operating systems, computer networks, mobile computing, and computer security. Technological development in this field is extremely important because it cannot only improve our real life but also have a profound impact on the development of other science and engineering.

Research Fields

- Computer Architecture
- Compiler
- Database
- Operating Systems
- Parallel and Distributed Computing
- Computer Networks
- Scientific Computing
- Artificial Intelligence
- Neural Network and Machine Learning
- Computer Vision, Image Processing, and Computer Graphics
- Information Retrieval and Data Mining
- Natural Language Processing

Homepage

<http://cse.unist.ac.kr/>

College of Natural Sciences

16. Department of Mathematical Sciences

Department of Mathematical Science explores the connections between mathematics and its applications at both the research and educational levels. In addition to focusing on a traditional study in pure mathematics, our research at UNIST is devoted to encompass some of the most diverse and interdisciplinary research in the physical, business, economics, engineering, and biological sciences. The department provides a dynamic and engaging research environment in scientific computing, mathematical biology, finance, dynamical systems, image processing, number theory and analysis in PDEs.

Research Fields

- Algebra
- Mathematical analysis
- Topology
- Geometry
- Applied mathematics

Homepage

<http://math.unist.ac.kr/>



17. Department of Physics

The Department of Physics at UNIST is a world-class research institution dedicated to advancing our understanding of the physical world and developing next-generation technologies. Our faculty members are leaders in their fields, conducting cutting-edge research in plasma and beam physics, quantum materials and optical physics, and soft matter and biological physics. Recent research achievements include breakthroughs in developing topological materials and devices, studying strongly correlated electrons, and applying machine learning to complex systems.

Our department offers students access to state-of-the-art facilities and resources and opportunities to work on research projects alongside faculty members. Graduates of our program have gone on to successful careers in academia, industry, and government, and our alumni network continues to grow and thrive. We also have strong partnerships with other institutions and companies, allowing us to collaborate on interdisciplinary research initiatives and bring our work to a wider audience.

At UNIST, we believe that physics forms the foundation for almost every other contemporary science and technology. We are committed to pushing the boundaries of our understanding of the physical world. If you are interested in pursuing a career in physics or if you are interested in collaborating with us on cutting-edge research, we invite you to explore the Department of Physics at UNIST.

Research Fields

Plasma | Beam Science & Astrophysics

- Nuclear Fusion & Plasma Science
- Astrophysics
- Accelerator & Laser-Plasma

Soft Matter | Statistical Physics

- Soft Condensed Matter
- Complex Systems & Machine Learning
- Biological Physics

Quantum Matter | Optical Physics

- Topological Material & Devices
- Strongly Correlated Electrons
- Quantum Optics & Quantum Information

Homepage

<http://physics.unist.ac.kr/>

18. Department of Chemistry

Chemistry is a central science that seeks to understand the interactions between atoms and molecules coupled with their applications. The Department of Chemistry at UNIST provides opportunities for students to obtain a deep fundamental knowledge in the field of chemistry including its sub-disciplines. In addition, students are encouraged to engage in research as such experiences are considered to be an essential educational tool. Research projects that utilize state-of-the-art facilities under the mentorship of world-class researchers (26 in total, students to faculty ratio = 2) are available to all students and set in collaborative environments. The primary goal of the department is to educate the next-generation of chemists and to provide them with the technical and leadership skills sets needed to contribute to society and to humankind.

Research Fields

- Physical/Computational Chemistry
- Organic Chemistry
- Inorganic Chemistry
- Materials/Polymer Chemistry
- Chemical Biology
- Biomaterials

Homepage

<http://chemistry.unist.ac.kr/>

School of Business Administration

The mission of the UNIST School of Business Administration (SBA) is to educate and develop leaders and enterprise builders, who create new wealth by integrating science & technology with business management. The academic curriculum of the School is specifically tailored to accomplish this mission by offering courses focused on critical thinking, data analytics, and entrepreneurship as well as a variety of courses across diverse management topics. Through our rigorous and contemporary curriculum, students will build a strong theoretical foundation and gain the competence for the pursuit of diverse career paths to become influential leaders, business champions, and change makers.

The School of Business Administration boasts faculty members who have obtained Ph.D. degrees from prominent institutions. Their courses enable students to acquire business knowledge and expertise by emphasizing personalized, experiential, and team-based learning. Specifically, by offering courses conducted in English, students develop creative confidence to effectively communicate their ideas in the international business settings. With the best faculty-student ratio in South Korea, research and education are personalized to each individual student and conducted via close faculty-student interactions, which provides a fertile ground for productive research opportunities for students.

Our students can enjoy various benefits, to wit: 1) access world-class education; 2) participate in research with faculty members; 3) study abroad; 4) sign up for practice-based or research-based internship programs; 5) obtain scholarship for almost all students; and 6) reside in dormitory complexes. The School of Business Administration will provide a transformational experience of learning and engaging and enable students to realize their full potential.

In 2018, the UNIST SBA was internationally accredited by the AACSB (Association to Advance Collegiate School of Business), which indicates that our programs at the bachelor's, master's, and doctoral levels have proven to be among the top 5 percent in business education worldwide. We hope that all young people who dream of becoming global leaders in the field of research or practice in cutting-edge new industries do join the UNIST SBA to leap together.

Research Fields

- Accounting
- Finance
- Marketing
- Management
- Human Resources
- Organizational Behavior
- Strategy
- IS / OM
- Management Information Systems
- Operations Management

Homepage

<http://management.unist.ac.kr/>

