

College of Natural Sciences

__Contact Information

Phone: +82-62-530-3305

URL: <http://natural.jnu.ac.kr>

■ Departments

- Department of Mathematics
- Department of Statistics
- Department of Physics
- Department of Chemistry
- Department of Biological Sciences
- Faculty of Earth Systems and Environmental Sciences
 - Geological Sciences major
 - Oceanography major
- School of Biological Sciences and Technology

■ Affiliated Research Centers

- Institute for Condensed Matter Theory
- Institute of Statistics

Mathematics

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URL: <http://math.jnu.ac.kr>

■ What is Mathematics?

Mathematics may be defined as the study of quantity, structure, space, relation, change, and various topics of pattern, form, and entity. Moreover, mathematics enables one to explain the essence of nature itself and extrapolate by utilizing rigorous mathematical logic. Mathematics can be divided into several departments of study: algebra, which is based on the operations of numbers; analysis, which studies the properties of functions; topology, which is the study of the properties of spaces; and applied math, which is concerned with the application of mathematical knowledge to other fields. Today, mathematics is used as an essential tool in many fields, including natural science, engineering, medicine, and social sciences, such as economics and psychology.

■ Department of Mathematics at CNU

The major in Mathematics was established in 1952 with the founding of Chonnam National University. The principal goal of the major in Mathematics is to conduct high quality instruction and research in pure and applied mathematics.

The Department offers undergraduate and graduate studies leading to Bachelor's, Master's, and Doctoral degrees.

The research fields of the Department include algebra, analysis, geometry, topology, applied mathematics, and mathematics education. In addition, the Department sponsors various groups of regular seminars for undergraduate students and colloquia for faculty members and graduate students.

■ Professors

- Dong-Soo Kim, Ph.D.
[Professor, Geometry, dosokim@jnu.ac.kr]
(Submanifold Theory, Conformal Vector Fields, Einstein Spaces)
[Professor, Combinatorial Mathematics, hkju@jnu.ac.kr]
(Dynamical Systems)
- Bok-Hee Im, Ph.D.
[Professor, Algebra, bim@jnu.ac.kr]
(Group Theory and their Generalizations, Non-associative Rings and Algebras Geometry, Cryptology)
- Hyeong-Kwan Ju, Ph.D.
[Professor, Applied Mathematics, jkim@jnu.ac.kr]
(Systems Theory, Operator Theory)
- Jeong-Ook Kim, Ph.D.
[Professor, Analysis, mkkwak@jnu.ac.kr]
(Partial Differential Equations,
- Min-Kyu Kwak, Ph.D.

- Ordinary Differential Equations,
Dynamical Systems)
- Young-Bok Chung, Ph.D.
[Professor, Analysis, ybchung@jnu.ac.kr]
(One or Several Variable Complex Analysis)
 - Jong-Taek Cho, Ph.D.
[Professor, Geometry, jtcho@jnu.ac.kr]
(Riemannian Geometry related with
Contact Structures or Complex Structures,
Pseudo-Hermitian Geometry, CR-Geometry)
 - Byeong-Chun Shin, Ph.D.
[Professor, Applied Mathematics,
bcsin@jnu.ac.kr] (Numerical Analysis)
 - Young-Joo Lee, Ph.D.
[Professor, Analysis, leeyj@jnu.ac.kr]
(Several Variable Complex Analysis)
 - Dae-Heui Park, Ph.D.
[Professor, Topology,
dhpark3331@jnu.ac.kr]
(Algebraic Topology,
Semi-Algebraic Topology)
 - Do-Yong Kwon, Ph.D.
[Professor, Number Theory,
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 - Hong-Sung Jin, Ph.D.
[Professor, Applied Mathematics,
hjin@jnu.ac.kr]
(Uniform Superconvergence Wavelets)
 - Sang-Wook Kim, Ph.D.
[Associate Professor, Algebra,
swkim.math@jnu.ac.kr]
 - Hyun-Cheul Lim, Ph.D.
[Assistant Professor, Financial Mathematics,
limhc@jnu.ac.kr]
 - Ji-Hoon Lee, Ph.D.
[Assistant Professor, Analysis,
jihoon@jnu.ac.kr]
(Partial Differential Equations and Dynamical
Systems)

■ Degree Requirements

Students are required to earn 130 credits, with 24 credits from general courses, 21 credits from core courses, and 21 credits from electives. Students are also required to demonstrate proficiency with computers and in a foreign language (English).

■ What Do You Study?

Core Courses

Linear Algebra and Laboratory (3)
Analysis 1 and Laboratory (3)
Set and Logic (3)
Topology 1 and Laboratory (3)
Differential Geometry 1 and Laboratory (3)
Abstract Algebra 1 and Laboratory (3)
Complex Variables 1 and Laboratory (3)

Electives

Algebra and Geometry (3)
Mathematical Programming and Laboratory(3)
Introduction to Geometry (3)

Differential Equations 1 and Laboratory (3)
Mathematical Statistics 1 (3)
Theory of Numbers (3)
Computer Aided Mathematics (3)
Analysis 2 (3)
Differential Equations 2 (3)
Actuarial Mathematics (3)
Advanced Linear Algebra (3)
Theory Of Mathematical Education (3)
Combinatorics and Graph Theory (3)
Basic Probability Theory (3)
Big data programming (3)
Teaching for Secondary School Mathematics (3)

A Course on Mathematics Logic and Essay writing (2)	Differential Geometry 2 (3)
Vector Analysis (3)	Teaching Skill in Mathematics (3)
Complex Variables 2 (3)	Applied Algebra (3)
Numerical Analysis and Laboratory (3)	Introduction to Mathematical Finance (3)
Topology 2 (3)	Topics in Mathematical (3)
Matrix Theory and its Applications (3)	Topics in Actuarial Mathematics (3)
Abstract Algebra 2 (3)	History of Mathematics (3)
Computational Finance and Practice (CapstonDesign) (3)	Introduction to Cryptography (3)
Basic of Real Analysis (3)	Topics in Combinatoric Graph Theory (3)
	Neural Network Learning (3)

■ Careers

Graduates often continue their study of mathematics in graduate school at CNU or other respected universities, both domestic and overseas and pursue academic careers afterwards. Other students pursue careers in quantitative analysis, as middle and high school teachers, researchers, computer programmers, actuaries, derivative specialists, and information security specialists.

■ What is Statistics?

Statistics is a broad mathematical discipline which studies ways to collect, summarize, and draw conclusions from data. It is applicable to a wide variety of academic disciplines, from physical and social sciences to the humanities, as well as to business, government, and industry.

Once data is collected, either through a formal sampling procedure or by recording responses to treatments in an experimental setting (experimental design), or by repeatedly observing a process over time (time series), graphical and numerical summaries may be obtained using descriptive statistics.

Patterns in the data are modeled to draw inferences about the larger population, using inferential statistics accounting for randomness, and uncertainty in the observations. These inferences may take the form of decision making (hypothesis testing), estimates of numerical characteristics (estimation), prediction of future observations, descriptions of association (correlation), or modeling of relationships (regression).

■ Major in Statistics

The major in Statistics was founded in 1990 and has made great developments. The Department currently has 10 professors, about 17 graduate students, and 230 undergraduate students. Balanced programs for students have been established so that they learn statistical theory, as well as practice analyzing data with various statistical computer packages. In order to support independent study, the Department provides three rooms exclusively for a Statistics Library and Computing Lab.

The Statistics Library is filled with numerous statistics and computer science books and relevant outstanding papers. The Computing Lab has computers with programs such as SAS, SPSS, Minitab, Python and R. The Department has active research programs in statistical genetics, bio-informatics, Bayesian statistics, statistical computing, pattern recognition and other topics.

■ Professors

- Young-Sook Son, Ph.D.
[Professor, ysson@jnu.ac.kr]
(Time Series Analysis, Data Mining,
Bayesian Statistical Inference)
- Jeong-Soo Park, Ph.D.
[Professor, jspark@jnu.ac.kr]
- (Design and Analysis of Computer Experiments
(Simulation), Meteorological Statistics,
Educational Statistics, Statistical Computing)
- Jang-Sun Baek, Ph.D.
[Professor, jbaek@jnu.ac.kr]
(Nonparametric Function Estimation,

- Multivariate Analysis, Bioinformatics, Pattern Recognition)
- Il-Su Choi, Ph.D.
[Professor, ichoi@jnu.ac.kr]
(Bayesian Statistics (MCMC), Mathematical Biology, Environmental Ecology Statistics)
 - Myung-Wan Na, Ph.D.
[Professor, nmh@jnu.ac.kr]
(Reliability Theory, Statistical Quality Control, Probabilistic Finite Element Method, Probabilistic Safety Assessment)
 - Eun-Sik Park, Ph.D.
[Professor, espark02@jnu.ac.kr]
(Longitudinal/Categorical Data Analysis, Statistical Methods in Medical Research, Clinical Trials, Bioinformatics)
 - Min-Soo Kim, Ph.D.
[Professor, kimms@jnu.ac.kr]
(Multivariate Analysis, Image Partition or Searching, Financial Statistics)
 - Jae-sik Jeong, Ph.D.
[Associate Professor, jjs3098@jnu.ac.kr]
(Bioinformatics (Metabolomics, Genomics), Biostatistics (clinical trials), Bayesian analysis)
 - Bong-Gyun Ko, Ph.D.
[Assistant Professor, bonggyun.ko@jnu.ac.kr]
interpretative public intelligence
 - Jeong-Gyu Huh, Ph.D.
[Assistant Professor, huhjeonggyu@jnu.ac.kr]
Machine-learning-based financial engineering

■ Degree Requirements

Students are required to earn 130 credits, with 15 credits from core courses, 33 credits from electives, 9 credits from core general education courses, and 16 credits from general electives.

Students are also required to write a graduation thesis or get a certificate of qualification.

■ What Do You Study?

■ General Education Core Courses

Writing

English for Global Communication 2

Introduction to Statistics and Practice

Scientific Investigation of Big Data

Career design and self-understanding

Year 1 Courses

■ Electives

Statistical Mathematics 1

Statistical Mathematics 2

Population and official statistics

Statistics package and Practice

Year 2 Courses

■ Core Courses

Mathematical Statistics 1

Mathematical Statistics 2

■ Electives

Financial statistics and Practice

Big Data programming and practice

Sampling Survey Method Theory

Financial derivatives Modeling

Big Data Process and Practice

Design of Experiments

Statistical Computation and Practice

Year 3 Courses

■ Core Courses

Regression Analysis and Lab

Multiplicate Statistical Analysis

Statistical Learning and Practice

■ Electives

Categorical Data Analysis

Bayesian Statistics and Practice
Market risk management
Credit risk management
Statistical Quality Control and Lab(capstone design)
Data Mining and Lab
Big Data analysis and Practice

Year 4 Courses

■ Electives

Time Series Analysis and Lab
Spatial Data analysis and Practice

Big data Capstone design
Theory of Financial Instruments
Theory of Biomedical Statistics
Statistical Data analysis and Practice
Probability and Stochastic Process

Minor Courses

Mathematical Statistics 1
Mathematical Statistics 2
Regression Analysis and Lab

■ Careers

Students may seek employment in a number of companies, including major conglomerates, statistical package development firms, life insurance companies, banks, research firms, and the civil service.

Physics

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■ What is Physics?

Physics may be seen as the most basic science in seeking the fundamental laws in nature. It involves the study of all natural phenomena to discover the laws of nature. The field also considers wide applications to other natural sciences, engineering, medical sciences, agricultural sciences, and even to social sciences, and serves as a source of high technologies.

■ Department of Physics at Chonnam National University

The Department educates students to become professionals. Some key aspects of the Department include:

- 18 experienced faculty members
- Balanced theory and experiment courses
- Intern program with industry
- Support for language program

The Department's advanced resources:

- Up-to-date educational facilities
 - Computer Lab, Audio/Video Classrooms
- Labs for fundamental and applied physics
 - Major Equipment: High Power Laser, Ion Implanter, Low Temperature Cryostat, High Energy Physics
- In-University research facilities
 - NMR, TEM, SEM, Raman, FT-IR, X-ray
 - RIE, Deposition, Lithography, RTA, PECVD

The Department supports international students through the following initiatives:

- Tuition fee exemptions
- Free dormitory support
- TA and RA positions available
- Additional support by supervising professors

■ Professors

- Chang Sub Kim, Ph.D. cskim@jnu.ac.kr]
[Professor, Condensed Matter Theory,
- Sun Hyun Youn, Ph.D.

- [Professor, Quantum Optics and Nonlinear Optics Experiments, sunyoun@jnu.ac.kr]
- En Jin Cho, Ph.D.
[Professor, Condensed Matter Experiments, ejcho@jnu.ac.kr]
 - Heung Ryoul Noh, Ph.D.
[Professor, Atom Optics, hrnoh@jnu.ac.kr]
 - Ki Cheon Kang, Ph.D.
[Professor, Mesoscopic Physics, kckang@jnu.ac.kr]
 - Sang Wan Ryu, Ph.D.
[Professor, Nano-Photonics, sangwan@jnu.ac.kr]
 - In Kag Hwang, Ph.D.
[Professor, Nano Optics, ikhwang@jnu.ac.kr]
 - Han Jin Noh, Ph.D.
[Professor, Condensed Matter Experiments, ffnhj@jnu.ac.kr]
 - Kyung Kwang Joo, Ph.D.
[Professor, High Energy Experiments, kkjoo@jnu.ac.kr]
 - Jae Sik Lee, Ph.D.
[Professor, Elementary Particle Physics Theory, jslee@jnu.ac.kr]
 - Ha Sul Kim, Ph.D.
[Professor, Optical Science & III-V Semiconductor, hydenkim@jnu.ac.kr]
 - Joong Wook Lee, Ph.D.
[Professor, Terahertz Photonics & Plasmonics, leejujc@jnu.ac.kr]
 - Dong ho Moon, Ph.D.
[Associate Professor, High Energy Experiments, dhmoon@jnu.ac.kr]
 - Geol Moon, Ph.D.
[Associate Professor, Atom Optics Experiments, cnuapi@jnu.ac.kr]
 - SoongGeun Je, Ph.D.
[Assistant Professor, Condensed Matter Experiments, gje@jnu.ac.kr]
 - Ara Go, Ph.D.
[Assistant Professor, Condensed Matter Theory/ Computational Physics, arago@jnu.ac.kr]
 - Chan Beom Park, Ph.D.
[Assistant Professor, Condensed Particle Physics Theory cbpark@jnu.ac.kr]

■ Degree Requirements

Students are required to earn 130 credits, with 48 credits from core courses and 14 credits from general courses. Students must also submit a thesis and demonstrate proficiency with computers and in a foreign language (namely English).

■ What Do You Study?

Core Courses

Physics Laboratory 1 (2)
Mechanics (3)
Physics Laboratory 2 (2)
Electromagnetism 1 (3)
Basic Optics Experiments (2)
Quantum Mechanics 1 (3)

Electromagnetism 2 (3)
Thermal and Statistical Physics 1 (3)
Quantum Mechanics 2 (3)

For a Minor Courses

Mechanics (3)
Electromagnetism 1 (3)
Quantum Mechanics 1 (3)

Electives

Photonics Field Practice 1 (2)
Photonics Field Practice 2 (2)
Field Practice 1 (2)
Mathematical Physics 1 (3)
Seminar in Mathematical Physics 1 (1)
Seminar in Mechanics (1)
Mathematical Physics 2 (3)
Electronic Instrumental Physics (3)
Seminar in Mathematical Physics 2 (1)
Modern Physics 1 (3)
Seminar in Electromagnetism 1 (1)
Seminar in Advanced Mechanics (1)
Advanced Mathematical Physics (3)
Modern Physics 2 (3)
Advanced Mechanics (3)
Seminar in Quantum Mechanics 1 (1)
Seminar in Electromagnetism 2 (1)
Physics with Computers (3)
Seminar in Quantum Mechanics 2 (1)
Seminar in Thermal and Statistical Physics 1 (1)
Optics (3)
Theory of Relativity (3)
Physics Laboratory 4 (2)
Thermal and Statistical Physics 2 (3)

Solid State Physics (3)
Advanced Physics Experiment 1 (2)
Seminar in Special Topics 1 (1)
Colloquium in Physics 1 (1)
Advanced Electro-Optics Laboratory (2)
Applied Optics (3)
Particle Physics (3)
Nuclear Physics (3)
Advanced Physics Experiment 2 (2)
Seminar In Special Topics 2 (1)
Colloquium In Physics 2 (1)
Fundamentals of Optoelectronics (3)

General Courses

General Physics 1 (3)
General Physics 2 (3)
General Physics Laboratory 1 (1)
General Physics Laboratory 2 (1)

Teaching Profession Courses

Physics Education (2)
Research of Physics Teaching Materials and Teaching Methods (2)
A course on Physics Logic and Essay Writing (2)

■ Careers

Graduates often continue their study of physics in graduate school, both domestically and at foreign universities, and pursue careers as researchers at institutes or in academia. Other positions they may qualify for including government officers, science teachers, and employees in photonics-related industries, semiconductor firms, Korea Electric Power, nuclear power plants, and the Center of Aviation and Space Technology.

■ What is Chemistry?

Chemistry is an experiment-based science. Thousands of scientists have made millions of experimental observations over several hundred years. From these observations, fundamental principles have been deduced regarding the properties and reactivity of matter. Skills and methods used by chemists are applicable to other facets of life, and can help to solve practical problems.

■ School of Chemistry at Chonnam National University

The Department of Chemistry consists of a prominent group of scientists, both faculty and students, who engage in a broad range of chemical, educational, and research activities. The faculty is dedicated to chemical education and prides itself on its graduate and undergraduate programs, which are designed to prepare students for active careers in industry and academia. Knowledge of chemistry is developed through intensive coursework, laboratory experiments, literature, and individual research efforts. This increases the chances for students to demonstrate their abilities for creative and innovative studies in various industries and research institutes after graduation. The Department is open to everyone who has a passion for chemistry.

■ Professors

- Hyoung-Ryun Park, Ph.D.
[Professor, Inorganic Chemistry,
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- Jae-Nyoung Kim, Ph.D.
[Professor, Organic Chemistry,
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- Jong-Hoon Oh, Ph.D.
[Professor, Organic Chemistry,
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- Che-Hun Jung, Ph.D.
[Professor, Biochemistry,
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- Sun-Woo Lee, Ph.D.
[Professor, Organic Chemistry,
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- Jeong-Sun Kim, Ph.D.
[Professor, Biochemistry,
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- Hyun-Dam Jeong, Ph.D.
[Professor, Physical Chemistry,
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- Hyun-Chul Choi, Ph.D.
[Professor, Analytical Chemistry,
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- Jun-seong Lee, Ph.D.
[Professor, Inorganic Chemistry,
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- Cheol-Won Lee, Ph.D.
[Professor, Biochemistry,
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- Sung Cho, Ph.D.
[Professor, Physical Chemistry,
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- Jimin Kim, Ph.D.

[Associate Professor, Organic Chemistry,
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• Kyungsu Na, Ph.D.

[Professor, Physical Chemistry,
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• Jeongsuk Seo, Ph.D.

[Associate Professor, Analytical Chemistry,

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• Changwoo Kim, Ph.D.

[Assistant Professor, Physical Chemistry,
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• Jacopo Tessarolo, Ph.D.

[Assistant Professor, Inorganic Chemistry,
jacopo@jnu.ac.kr]

■ Degree Requirements

Students are required to earn 130 credits, with 36 credits from core courses, and 19 credits from general courses. Students must also demonstrate proficiency with computers and in a foreign language (English).

■ What Do You Study?

Core Courses

Physical Chemistry 1 (3)

Analytical Chemistry 1 (3)

Analytical Chemistry Lab 1 (1)

Physical Chemistry Lab 1 (1)

Organic Chemistry 1 (3)

Analytical Chemistry Lab 2 (1)

Physical Chemistry Lab 2 (1)

Biochemistry 1 (3)

Inorganic Chemistry 1 (3)

Inorganic Chemistry Lab 1 (1)

Biochemistry Lab 1 (1)

Organic Chemistry Lab 1 (1)

Organic Chemistry Lab 2 (1)

Inorganic Chemistry Lab 2 (1)

General Chemistry 1 (3)

Organic Chemistry 3 (3)

Quantum Chemistry 1 (3)

Synthesis of Organic Materials for Semiconductor (3)

Biochemistry 2 (3)

Biochemistry Lab 2 (1)

Coordination Chemistry (3)

Inorganic Chemistry 2 (3)

Quantum Chemistry 2 (3)

Instrumental Analysis Lab (2)

Advanced Physical Chemistry 1 (3)

Inorganic semiconductor Materials Chemistry (3)

Organic Spectroscopy (3)

Advanced Biochemistry (3)

Instrumental Analytical Methods (3)

Enzymology (3)

General Biology 1 (3)

Chemistry Laboratory 1 (1)

Biology Laboratory 1 (1)

General Chemistry 2 (3)

General Biology 2 (3)

Chemistry Laboratory 2 (1)

Biology Laboratory 2 (1)

Electives

Physical Chemistry 2 (3)

Analytical Chemistry 2 (3)

History of Science (2)

Organic Chemistry 2 (3)

Advanced Physical Chemistry 2 (3)

Organic Synthesis (3)

Environmental Analytical Chemistry (3)

Minor Courses

Physical Chemistry 1 (3)

Organic Chemistry 1 (3)

Inorganic Chemistry 1 (3)

Teaching Profession Courses

Chemistry Education (2)

Research of Chemical Teaching Materials and

Teaching Methods (2)

■ Careers

Most chemistry majors go on to jobs in precision chemistry, semiconductor chemistry, heavy industries, the petrochemical industry, and pharmaceuticals.

All major chemical companies send requests for the Department's students throughout the year. Many smaller companies and academic institutions also contact individual faculty members when positions become available.

Such openings are made known to all students, and every effort is made to find suitable jobs for graduates. Strong ties exist between the Department and the chemical industry. Graduates hold industrial or academic positions, or they are employed by the government or research institutes.

■ What is Biological Sciences?

Biological Sciences (Biology) is the science studying the fundamental phenomena of life. Biology encompasses diverse fields, including botany, zoology, ecology, evolution, genetics, molecular biology, cell biology, physiology, and bioinformatics. The Department of Biological Sciences is committed to advancing our understanding of biological function, and developing new technologies to address current and emerging problems facing all living organisms. In addition to the standard biology program, our faculty provide academically-motivated undergraduate students the opportunity to participate cutting-edge research projects. The department focuses on the integration of research and teaching expertise to create opportunities in the training of future leaders in the field of biological sciences. Students who successfully complete our excellent curriculum will have knowledge in biology for a graduate or professional career in applied biological sciences, such as biomedical sciences and agriculture. Biology is certainly the leading science in the 21st century.

■ Department of Biological Sciences

The Department of Biological Sciences offers competitive training programs for undergraduate and graduate students in biological sciences. The department's faculty members (12 professors, 2 adjunct professors, and teaching faculty) are responsible for over 60 courses in modern biology and play leading roles in teaching and research. Faculty interests include: Biochemistry, Biotechnology, Mycology, Molecular Immunology, Cell and Molecular Biology, Plant Physiology, Taxonomy, Biomimetics, Ecology, Restoration Ecology, Economic Botany and Ecotoxicology.

Twelve research laboratories are fully equipped for the pursuit of developing practical knowledge of these fields.

A key goal of the Department of Biological Sciences is to promote the practical experience required for a career in the biological sciences by applying these research tools with our students.

■ Professors

- Hwang Hee Lee, Ph.D.
[Professor, Molecular Cell Physiology,
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- Hak Young Lee, Ph.D.
- Eungseok Kim, Ph.D.
[Professor, Molecular Metabolism,
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- ekim@jnu.ac.kr]
- Geun-Joong Kim, Ph.D.
[Professor, Molecular Microbiology, gjkim@jnu.ac.kr]
 - Il-Chul Kim, Ph.D.
[Professor, Functional Genomics, ickim@jnu.ac.kr]
 - Ha-Cheol Sung, Ph.D.
[Professor, Animal Ecology,
 - Dong-Ha Nam, Ph.D.
[Professor, Ecobiochemistry, dongha@jnu.ac.kr]
 - Dong-Hyun Lee, Ph.D.
[Professor, Genomic Stability,

- donghyunlee73@jnu.ac.kr]
- Eung-Sam Kim, Ph.D.
[Professor, Cellular Mechabiology, Biomimetics, eungsam.kim@jnu.ac.kr]
 - Dong-Hun Lee, Ph.D.
[Assistant Professor, Animal Physiology, DHUN@jnu.ac.kr]
 - Hee-Jin Park, Ph.D.
[Assistant Professor, Molecular and Cellular Plant Physiology, hjpark_bio@jnu.ac.kr]
 - Ji-Hoon Lee, Ph.D.
[Associate Professor, Biochemistry and Cell Biology, microljh@jnu.ac.kr]

■ Degree Requirements

Students are required to earn 130 credits, with 11 credits from general courses, 15 credits from core courses, and 33 credits from electives. Students are also required to write a graduation thesis.

■ What Do You Study?

Core Courses

Cell Biology (3)
General Microbiology (3)
Introduction to Ecology (3)
Bioinformatics & Experiment (3)
Molecular Biology (3)

Electives

Biodiversity and evolution (3)
Introduction to Systems Biology (3)
Aquatic Biology (3)
Toxicobiology (3)
Wildlife Conservation and Management and Exp. (3)
Ecological modeling and Exp. (3)
Ecological census methods and Exp. (3)
Phycology (3)
Animal Taxonomy (3)
Plant Morphology (3)
Plant Taxonomy (3)
Entomology (3)
Microbial Physiology (3)

Molecular Physiology (3)
Plant Physiology (3)
Animal Physiology (3)
Immunology (3)
Molecular Genetics Lab. (2)
Experimental Biology 1 (3)
Experimental Biology 2 (3)
Molecular Biotechnology (3)
Developmental Biology (3)
Fungal biology (3)
Restoration Ecology and Exp. (3)
Food Microbiology and Practice (3)
Nanobiology and Design of Nanobiosystems (3)
Phylogenetic Systematics and Practice (3)
Environmental Biology (3)
Resource Biology (Capstone Design) (3)
Comparative Genomics (3)
Methods in Biostatistics and Exp. (3)
Biomimetics (3)
Organic Chemistry (3)
Biological Chemistry 1 (3)

Biological Chemistry 2 (3)
Genetics (3)
Biology Education (3)
A Research Of Biology Teaching Materials &
Teaching Method (3)
A Course on Biology Logic and Essay Writing (2)

General Courses

General Chemistry 1 (3)
Biology Laboratory 1 (1)

Biology Laboratory 2 (1)
General Biology 1 (3)
General Biology 2 (3)

Minor Courses

Cell Biology (3)

Minor Electives

21 credits must be chosen

■ Careers

Graduates may pursue careers in bioindustries, education, biotechnology firms, natural history museums, and research institutes.

■ What is Geology?

Geology is the scientific study that aims to understand the origin, structure, physical, biological and chemical processes, and history of the Earth and its surface features using diverse scientific and engineering methods. The sustainable use of natural resources and the preservation of the Earth's environment require a sound knowledge of geology and geological processes. In order to solve these problems, geologists study a broad range of issues such as the origin and genesis of rocks constituting the Earth, the structural process and evolutionary history of the Earth, the exploration of Earth's resources, and the mitigation of natural hazards. The studies of modern geology are not restricted to traditional topics because the origin, migration, and quality of ground-water, and soil contamination and remediation are also topics in geology. Therefore, geology is more of an applied science than a simple one, which requires basic knowledge of physics, chemistry, biology, and mathematics.

Throughout history, geology has provided practical information for bettering our lives and is believed to play a key role in the development of a sustainable society that is in harmony with the Earth.

■ Department of Geology

The Department of Geology provides an outstanding environment for studies of the Earth and planetary processes, as revealed by their composition, structure, and history. The department seeks to understand the fundamental processes defining the origin, evolution, and current state of Earth systems and to use this understanding to predict future states to solve environmental problems. The department is composed of the following three major research areas:

1) Pure/Basic Geology: conducting broad investigations on Solid Earth: rocks, minerals, and fossils of past and present geological environments and predicting the future.

2) Applied Geology: geological and seismological studies of practical issues related with the geological stability of a critical structure, such as a nuclear power plant or nuclear waste disposal.

3) Environmental Geology: practical application of the principles of geology in solving environmental problems, such as soil and ground water contaminations and their remediation.

Specific research encompasses igneous/metamorphic petrology, economic mineral deposits, paleontology, sedimentary environments, environmental hydrogeology, biogeochemistry, geophysics computational geodynamics and Earth materials science including classical mineralogy. The department's programs include

interdisciplinary research and teaching that bring the unique perspective of geology to scientific problems at diverse spatial and temporal scales. The department currently has 8 faculty members.

Currently, the department has 24 graduate students; 162 undergraduate students are majoring in geology.

The department's programs offer courses leading to Bachelor's, Master's, and Doctoral degrees in geology. The department's faculty members, graduate students, and undergraduate students are involved in field, laboratory, experimental, and modeling studies to solve geological and environmental problems.

■ Professors

- Min Huh, Ph.D.
[Professor, Paleontology, minhuh@jnu.ac.kr]
- In-Wook Yeo, Ph.D.
[Professor, Environmental Hydrogeology, iwyeo@jnu.ac.kr]
- Yul Roh, Ph.D.
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- Dong-Hoon Sheen, Ph.D.
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- Donghoon Seoung, Ph.D.
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- Tae Soo Chang, Ph.D.
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- Yi-rang Jang, Ph.D.
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- Byung-choon Lee, Ph.D.
[Assistant Professor, Petrology, leebc@jnu.ac.kr]

■ Degree Requirements

Students are required to earn 130 credits, with 21 credits from core courses. Students must also submit a thesis and demonstrate proficiency with computers and in a foreign language (English).

■ What Do You Study?

General Courses

General Chemistry 1 (3)
Mathematics 1 (3)
General Physics 1 (3)
General Biology 1 (3)

Core Courses

Introduction to Geology and Lab. (3)
Optical Crystallography and Lab (3)
Structural Geology and Lab. (3)
Seismology and Lab. (3)
Geological Survey and Lab. (3)
Sedimentology and Stratigraphy and Lab. (3)

Elective Courses

Data Analysis in Geology and Practice (3)
Soil Environmentology and Lab (3)
Applied Mathematics for Geologists (3)
Earth History and Lab (3)
Element of Geology and Lab (3)
Environmental Geology and Lab (3)
Geophysics and Lab (3)
Paleontology and Lab (3)
Marine Geology and Lab (3)
Field Geology and Lab (3)
Optical Crystallography and Lab (3)
Seismology and Lab (3)
Micropaleontology and Lab (3)
Hydrogeology and Lab (3)

Structural Geology and Lab (3)
Environmental Geochemistry and Lab (3)
Economic Geology and Lab (3)
Engineering Geology and Lab (3)
Coastal Geology and Lab (3)
Geometric Techniques of Structural Geology and Exercise (3)
Meteorology and Lab (3)
Contaminant Hydrogeology and Lab (3)
Geology of Korea and Exercises (3)
Geochemistry and Lab (3)
Exploration Geophysics and Lab (3)
Geochemical Prospecting and Lab (3)
Quaternary Paleoclimatology & Paleoceanography

and Lab (3)
Meteorological Observation and Lab (3)
Applied Mechanics in Geology and Lab (3)
Paleoenvironmentology and Lab (3)
Micrometeorology and Lab (3)
Cultural Heritage Geology (3)
Geomicrobiology and Lab (3)
Resource Geology and Lab (3)
Earth Data Processing and Lab (3)

Teaching Profession Courses

Earth Science Education (2)
Material Evaluation and Teaching Method in Earth Science (2)

■ Careers

Graduates may seek careers with the Korea Institute of Geoscience and Mineral Resources, Korea Ocean Research and Development Institute, Korea Agricultural and Rural Infrastructure Corporation, Korea Water Resources Corporation, Natural Science Museum, Korea National Oil Corporation, Korea Resources Corporation, and Korea Meteorological Administration. Graduates may find positions as curators, educators, and researchers.

Oceanography

— Contact Information

Phone: +82-62-530-3460

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URL: <http://oceanography.jnu.ac.kr/>

■ What is a Major in Oceanography?

The Department of Oceanography has 9 full-time faculty members and several part-time lecturers engaged in teaching and research at both postgraduate and undergraduate levels. The Department conducts interdisciplinary research in coastal marine environments, maintains advanced laboratories, seeks public and private research funds, and recruits and retains qualified faculty, staff, and students. It provides an effective learning environment for students who are interested in careers in marine science or related fields, and also for students who are interested in science-based management of contaminated and coastal environments impacted by human development. Faculty research interests range from the ecology of phytoplankton, macro-alga zooplankton and nekton to the biogeochemical cycle of elements and numerical modeling of coastal processes. Graduates from the Department of Oceanography hold many faculty positions in universities and colleges, as well as research positions in industry, private research institutions, national laboratories, and regulatory agencies.

■ Professors

- Kwang Young Kim, Ph.D.
[Professor, Marine Ecology,
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- Byeong-Gweon Lee, Ph.D.
[Professor, Chemical Oceanography,
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- Myung Gil Park, Ph.D.
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- Byoung-Ju Choi, Ph.D.
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- Yoo-Geun Ham, Ph.D.
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- Se Hyeon Jang, Ph.D.
[Assistant Professor, Biological Oceanography,
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■ Degree Requirements

Students are required to earn 130 credits, with 24 credits from general courses, and 36 credits from core courses. Students must also take the following courses:

- Biological Oceanography & lab 1

- Physical Oceanography & lab 1
- Chemical Oceanography & lab 1
- Marine Ecology & lab
- Geological Oceanography & Lab 1
- To graduate, students must submit a thesis or a certificate.

■ What Do You Study?

General Courses

Mathematics 1
 General Chemistry 1
 General Physics 1
 General Biology 1

Core Courses

Biological Oceanography & lab 1 (3)
 Physical Oceanography & lab 1 (3)
 Chemical Oceanography & lab 1 (3)
 Marine Ecology & lab (3)
 Geological Oceanography & Lab 1 (3)

Electives

Differential Equation (3)
 Physical Oceanography and Lab 1 (3)
 Biological Oceanography and Lab 1 (3)
 Geological Oceanography and Lab 1 (3)
 Chemical Oceanography and Lab 1 (3)
 Physical Oceanography and Lab 2 (3)
 Biological Oceanography and Lab 2 (3)
 Geological Oceanography and Lab 2 (3)
 Chemical Oceanography and Lab 2 (3)
 Marine Analytical Chemistry and Lab (3)
 Oceanological Data Process & Lab (3)
 Sedimentology and Lab (3)
 Marine Ecology and Lab (3)
 Marine Zoology & Lab. (3)
 Marine Sedimentology and Lab. (3)
 Ecology of Marine Fishes and Lab. (3)
 Regional Oceanography (3)

Seawater Analysis and Lab. (3)
 Marine Phycology and Lab. (3)
 Population Ecology and Lab. (3)
 Benthos Ecology and Lab. (3)
 Marine Pollution and Lab (3)
 Deep-Sea Geology and Lab. (3)
 Tide and Waves (3)
 Marine Microbiology and Lab. (3)
 Fundamentals of Ecotoxicology (3)
 Coastal Oceanography (3)
 Marine Planktology & Lab 1 (3)
 Marine Planktology & Lab 2 (3)
 Shipboard training on ocean observations (3)
 Marine Molecular Biology & Lab (3)
 Atmosphere-Ocean Dynamics and Lab. (3)
 Atmosphere-Ocean Numerical Forecasting and Lab. (3)
 Climate Dynamics & Climate Change modeling (3)
 Coastal Conservation Ecology and Lab (3)
 Methods and techniques in ocean observations (3)
 Marine Physical Data Analysis & Practice (3)
 Advanced Ocean Science (3)
 Marine Biotechnology & Lab (3)
 Marine Biogeochemistry & lab. (3)
 Atmospheric Physics Lab (3)
 Oceanographic Meteorology and Climate Dynamics & Lab (3)
 Marine Ecosystem Modeling and Lab (3)
 Climate Big Data Programing & Practice (3)
 Satellite Oceanography (3)
 Earth system data analysis using AI algorithm (3)

■ Careers

Graduates from the Department of Oceanography hold research positions in industry, private research institutions, and laboratories connected to marine sciences.

■ What is Biological Sciences and Technology?

Biological Sciences and Technology is the field of study which explores the principles of life phenomena and applies the results of scientific research to high-tech industries. It is a cutting-edge technology field which strives to promote the health and welfare of humankind, focusing on such diverse fields as medicine, health, pharmaceuticals, food, environment, agriculture, and energy. As a future-oriented industrial field, it promises to create numerous high-value-added industries in the knowledge-based society of the 21st century.

■ School of Biological Sciences and Technology

Key aspects of the School include:

- Cutting-edge research facilities to support its students' studies and research
- Varied programs to provide BT-related specialization and the possibility to conduct advanced experimentation
- Scholarship programs and a generous system of incentives
- Scholarships made available through the New University Regional Innovation project
- Excellent education delivered by distinguished faculty members, as well as an industry/academia/research collaboration system
- A renowned graduate school
- It is Korea's first independent faculty combining biological science, a basic science, as well as biological engineering, an applied science.

■ Professors

Major of Biological Science/Major of Systems Biology

- Jaemog Soh, Ph.D.
[Professor, Genetics,
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- Chul-Ho Yun, Ph.D.
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- Hueng-Sik Choi, Ph.D.
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- Hyung Sik Kang, Ph.D.
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- Chungoo Park, Ph.D.
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- Soo-Jin Yeom, Ph.D
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- Jae Sung Shim, Ph.D.
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- Hyung Chul Lee, Ph.D.
[Assistant Professor, Developmental Biology,
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■ Degree Requirements

Students in the major of Biological Science or major of Systems Biology are required to earn 130 credits, with 32 credits from general courses and 48 credits from core courses.

■ What Do You Study?

School of Biological Sciences and Technology

General Studies

General Chemistry 1 (3)
General Chemistry 2 (3)
Chemistry Laboratory 1 (1)
Biology Laboratory 1 (1)
Biology Laboratory 2 (1)
General Biology 1 (3)
General Biology 2 (3)
Total Credits 15

Major Electives

Introduction to Biological Science and Technology (3)
English for Biological Sciences and Technology (3)

Major of Biological Science

Molecular Biology 1 (3)
Plant Physiology (3)
Molecular Biology 2 (3)
Virology (3)
Animal Physiology (3)

Developmental Biology (3)
Cell Biology 1 (3)
Life Science Fundamental Experiments 1 (2)
Cell Biology 2 (3)
General Microbiology 1 (3)
Life Science Fundamental Experiments 2 (2)
Genetics (3)
General Microbiology 2 (3)
Biological Sciences Research 1 (3)
Biological Sciences Research 2 (3)
Cancer Biology (3)
Bioinformatics (3)
Endocrinology (3)
Metabolic Engineering (3)
Cellular Signal Transduction (3)
Introduction to Biomedical Science (3)
Neurobiology (3)
Plant Molecular Biology (3)
Introduction to Brain disease (3)
Bioethics (3)
Methods in Cell Biology (3)
Introduction to History of Biological Sciences (3)
Independent Research 1 (3)

Independent Research 2 (3)
Stem Cell Biology (3)
Biotechnology and Biological Sciences Capstone Design 1 (3)
Biotechnology and Biological Sciences Capstone Design 2 (3)
Immunology1 (3)
Immunology2 (3)
Plant metabolism (3)
Biochemistry 1 (3)
Organic Chemistry (3)
Biochemistry 2 (3)
Molecular Genetics (3)
Methods in Biochemistry and Molecular Biology (3)
Human Physiology (3)

Major of Systems Biology

Molecular Biology 1 (3)
Molecular Biology 2 (3)
Cell Biology 1 (3)
Cell Biology 2 (3)
General Microbiology 1 (3)
Genetics (3)
General Microbiology 2 (3)
Biological Sciences Research 1 (3)
Biological Sciences Research 2 (3)
Biology of Sexuality (3)
Bioinformatics (3)

Genomics (3)
Introduction to Systems Biology (3)
Systems Cell Biology (3)
Protein and Enzyme Engineering (3)
Bioethics (3)
NeuroBiochemistry (3)
Introduction to History of Biological Sciences (3)
Independent Research 1 (3)
Independent Research 2 (3)
Stem Cell Biology (3)
Biotechnology and Biological Sciences Capstone Design 1 (3)
Biotechnology and Biological Sciences Capstone Design 2 (3)
Cell Differentiation (3)
Immunology 1 (3)
Immunology 2 (3)
Introduction to synthetic biology (3)
Introduction to bioenergy (3)
Bio-energy colloquium (3)
Biomedical data analysis and practices (3)
Understanding genetic variation and disease (3)
Biochemistry 1 (3)
Biochemistry 2 (3)
Organic Chemistry (3)
Molecular Genetics (3)
Plant Genetic Engineering (3)
Life Science Fundamental Experiments 1 (2)
Life Science Fundamental Experiments 2 (2)

■ Careers

- graduate school (overseas and domestic)
- medical or dental school
- college of pharmacy
- research institutes: Korea Research Institute of Bioscience and Biotechnology (KRIBB), and Institute for Basic Sciences, etc.
- biotech industry: Samsung Bioepis, Samsung BioLogics, LG Life Sciences Ltd., CJ Bio & Pharma, and Mogam Biotechnology Research Institute, etc.
- bioventures
- pharmaceuticals, cosmetics or food industry
- civil service: medical, pharmaceutical or environmental fields