

# Natural Science

## Natural Science

Natural Science

# Department of Mathematics

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The department of Mathematics offers Ph. D. and M. S. programs designed to prepare students for career in mathematical research, teaching and other mathematical fields. Graduate students can work with faculty members on various projects in both pure and applied mathematics, including algebra, analysis, combinatorics, dynamical systems and biomathematics.

Upon completion of graduate studies, students can move into professional positions at universities, as well as various sectors that require mathematical skills.

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## AREAS OF SPECIALIZATION

The specialized research areas in the department include :

Analysis – Functional Analysis, Nonlinear Analysis, Complex Analysis

Algebra – Number Theory, Algebraic Geometry

Applied Mathematics – Cryptography, Combinatorics, Dynamical Systems, Biomathematics, Mathematical Biology

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## PROGRAM OF STUDY

The department of Mathematics offers programs for Ph. D. and M. S. degrees. Each program offers basic courses of master's level and advanced research topics courses in a variety of areas including algebra, analysis, topology, combinatorics, dynamical systems and mathematical biology. The department also offers customized courses depending on each student's ability.

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## CONTACT INFORMATION

Department of Mathematics

TEL : 82-2-820-0410

FAX : 82-2-826-2979

E-mail : [math@ssu.ac.kr](mailto:math@ssu.ac.kr)

Website : <http://math.ssu.ac.kr>

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## COURSES

### Common Courses

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21602768	Real Analysis I
21602769	Real Analysis II
21602770	Complex Analysis
21602771	General Topology I
21602772	General Topology II
21602773	Abstract Algebra I
21602774	Abstract Algebra II
21602775	Differential Geometry I
21602776	Differential Geometry II
21602835	Analysis I
21602836	Analysis II

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### Analysis

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21602779	Functional Analysis I
21602780	Functional Analysis II
21602781	Functions of Several Complex Variables I
21602782	Functions of Several Complex Variables II
21602783	Complex Manifolds
21602784	Operator Theory I
21602785	Operator Theory II
21602786	Theory of Ordinary Differential Equations I
21602787	Theory of Ordinary Differential Equations II
21602788	Theory of Partial Differential Equations I
21602789	Theory of Partial Differential Equations II
21602790	Harmonic Analysis I
21602791	Harmonic Analysis II
21602792	Topics in Analysis I
21602793	Topics in Analysis II
21602795	Topics in Analysis III
21602796	Topics in Analysis IV
21602797	Seminar in Analysis I
21602798	Seminar in Analysis II

## Topology

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21602799	Algebraic Topology I
21602800	Algebraic Topology II
21602801	Differential Topology I
21602802	Differential Topology II
21602803	Homotopy Theory
21602804	Topological Groups I
21602805	Topological Groups II
21602806	Topics in Topology I
21602807	Topics in Topology II
21602809	Topics in Topology III
21602810	Topics in Topology IV
21602811	Seminar in Topology I
21602812	Seminar in Topology II

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## Algebra

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21602813	Homology Algebra
21602814	Group Theory
21602815	Ring Theory
21602816	Field Theory
21602817	Lie Algebra I
21602818	Lie Algebra II
21602819	Lattice Theory I
21602820	Lattice Theory II
21602821	Algebraic Number Theory
21602822	Topics in Algebra I
21602823	Topics in Algebra II
21602825	Topics in Algebra III
21602826	Topics in Algebra IV
21602827	Seminar in Algebra I
21602828	Seminar in Algebra II

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## Applied Mathematics

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21602872	Advanced Numerical Analysis I
21602874	Advanced Numerical Analysis II
21602857	Numerical Partial Differential Equations I
21602858	Numerical Partial Differential Equations II
21602854	Methods in Applied Mathematics I
21602859	Methods in Applied Mathematics II
21602838	Combinatorics I
21602860	Combinatorics II
21602861	Graph Theory I
21602875	Graph Theory II
21602862	Coding Theory I
21602863	Coding Theory II
21602864	Mathematical Physics I
21602865	Mathematical Physics II
21602866	Topics in Applied Mathematics I
21602867	Topics in Applied Mathematics II
21602868	Topics in Applied Mathematics III
21602869	Topics in Applied Mathematics IV
21602870	Seminar in Applied Mathematics I
21602871	Seminar in Applied Mathematics II

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## DEPARTMENTAL REQUIREMENTS

- 1st Semester : Real Analysis I / Abstract Algebra I / General Topology I
- 2nd Semester : Real Analysis II / Abstract Algebra II / General Topology II
- 3rd Semester : Differential Geometry I / Complex Analysis
- 4th Semester : Differential Geometry II

## MEMBERS OF FACULTY

Name	Position	Degree	Major	E-mail
Hwang, Sunwook	Professor	Ph.D. (Univ. of Connecticut)	Analysis & Math Education	shwang@ssu.ac.kr
Jeong, Dalyoung	Professor	Ph.D. (City Univ. of New York)	Combinatorics	dyjeong@ssu.ac.kr
Lee, Euiwoo	Professor	Ph.D. (Ohio State Univ.)	Biomathematics	ewlee@ssu.ac.kr
Kim, Jeong Heon	Professor	Ph.D. (Univ. of Illinois at Urbana-Champaign)	Complex Analysis	jkim@ssu.ac.kr
Song, Yoonjung	Assistant Professor	Ph. D.(Univ. of Maryland Baltimore County)	Optimization	yoonsong@ssu.ac.kr
Shim, Eunha	Associate Professor	Ph. D. (Arizona State Univ.)	Biomathematics	alicia@ssu.ac.kr
Lee, Chong Gyu	Assistant Professor	Ph.D. (Brown Univ.)	Number Theory	cglee@ssu.ac.kr
Yie, Sangsuk	Emeritus Professor	Ph.D. (Seoul National Univ.)	Topology	ssyie@ssu.ac.kr
Park, Eunsoon	Emeritus Professor	Ph.D. (Kansas State Univ.)	Algebra	espark@ssu.ac.kr
Kim, Yeonok	Emeritus Professor	Ph.D. (Korea Univ.)	Algebra	yokim@ssu.ac.kr

The main goal of the graduate program in the Department of Physics is to provide professional education to potential physicists in theoretical and experimental physics. It also aims to train professional researchers in various fields of industry where background knowledge in physics is essential.

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## AREAS OF SPECIALIZATION

### Condensed Matter Physics

- X-Ray Physics
- Nano Mesoscopic Physics
- Statistical Physics
- Superconductivity
- Spectroscopy in Solids
- Surface/Interface/Thin Film Physics

### Nuclear, Particle, and Astrophysics

- Elementary Particle Physics
- Astroparticle Physics
- Nuclear Astrophysics

### Plasma Physics

- Plasma Physics

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## PROGRAM OF STUDY

Graduate education in physics at Soongsil University offers students a variety of courses in both theory and experiments. In theory, training is focused on the enhancement of ability to simplify given physical phenomena, to build physical models, and to analyze them using mathematical and computational methods. In experiments, students may learn various methods of testing and verifying physical theories by executing experiments and analyzing their results.

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## CONTACT INFORMATION

Department of Physics

TEL : 82-2-820-0420

FAX : 82-2-824-4383

E-mail : physics@ssu.ac.kr

Website : physics.ssu.ac.kr

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## COURSES

### Common Courses

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21602876	Classical Mechanics
21602877	Electricity and Magnetism
21602878	Electrodynamics
21602879	Quantum Mechanics
21602880	Advanced Quantum Mechanics
21602881	Mathematical Physics
21602883	Statistical Mechanics
50084150	Special Topics in Physics 1
50084151	Special Topics in Physics 2
21602891	Advanced Physics Laboratory
50084152	Physics Seminar 1
50084153	Physics Seminar 2
21602906	Physics Research 1
21602907	Physics Research 2

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### Condensed Matter Physics

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21602882	Atomic and Molecular Physics
21602884	Advanced Statistical Mechanics
21602885	Physics of Magnetism
21602896	Spectroscopy
21602888	Field Theory and Statistical Physics
21602897	Quantum Optics
21602898	Applied Optics



21602899	Nonequilibrium Statistical Mechanics
21602900	Phase Transitions and Critical Phenomena 1
21602901	Phase Transitions and Critical Phenomena 2
21602902	Mathematical Statistical Mechanics
21602903	Topics in Statistical Physics
21602904	Advanced Magnetic Physics
21602908	Solid State Physics 1
21602909	Solid State Physics 2
50084154	Optical Properties of Solids
21602912	Special Topics in Optical Properties of Solids
21602913	Magneto-optics Physics
50084155	Spectroscopy of Solids 1
50084156	Spectroscopy of Solids 2
21602916	Introduction to Superconductivity
21602917	Advanced Superconductivity 1
21602918	Advanced Superconductivity 2
21602919	Advanced Topics in Superconductivity
21602920	Topics in Magnetic Physics
21602921	Introduction to X-ray Diffraction and Applications
21602922	Advanced X-ray Diffraction Theory
21602923	Special Topics in X-ray Diffraction
21602924	Nano Physics
21602925	Molecular Electronics
21602926	Low-Dimensional Physics
21602927	Surface Physics
21602928	Synchrotron Radiation Physics
21602929	Structural Analysis of Thin Films
50086777	Organic Semiconductor Physics
50276341	Advanced Organic Semiconductors I
50276342	Advanced Organic Semiconductors II

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#### Nuclear, Particle, and Astrophysics

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21602887	Quantum Field Theory
21602932	Nuclear Physics
21602933	Advanced Nuclear Physics
21602934	Linear Accelerator Physics
21602935	Many-Body Problems
21602936	Elementary Particle Physics

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21602937	General Relativity
21602938	Advanced Quantum Mechanics 2
21602948	Gravitation and Cosmology
21602949	Astrophysics
21602950	Advanced Astrophysics
21602951	Cosmological Physics
50276343	Nuclear Astrophysics

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## Plasma Physics

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21602939	Plasma Physics
21602940	Advanced Plasma Physics1
21602941	Advanced Plasma Physics2
21602942	Applied Plasma Physics
50084157	Space Plasma Physics
50084158	Tokamak Physics 1
50084159	Tokamak Physics 2
50084160	Numerical Simulations of Plasma
50084161	Plasma Diagnostics
21602946	Turbulence1
21602947	Turbulence2

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## DEPARTMENTAL REQUIREMENTS

### Master course

A candidate must take three out of four option modules (Classical Mechanics, Electricity and Magnetism, Quantum Mechanics, and Statistical Mechanics) before applying for the qualifying exam.

### PhD course

- 1) A candidate must publish at least one paper related to his/her dissertation in an SCI journal. A certificate of acceptance for publication is regarded as identical to actual publication.
- 2) After completion of course work, a candidate must give a presentation at least once a semester on the progress of dissertation in the presence of professors of the department of physics. A presentation in a physics conference may be accepted as a substitute upon approval.

## MEMBERS OF FACULTY

Name	Position	Degree	Major	E-mail
Lee, Tae Hoon	Professor	Ph.D. (SNU)	Quantum Field Theory	thlee@ssu.ac.kr
Kim, Chang-Bae	Professor	Ph.D. (Princeton Univ.)	Plasma Physics	cbkim@ssu.ac.kr
Kim, Jin-Min	Professor	Ph.D. (Brown Univ.)	Statistical Physics	jmkim@ssu.ac.kr
Kim, Hee-Sang	Professor	Ph.D. (Purdue Univ.)	Theoretical Condensed Matter Physics	hskim@ssu.ac.kr
Chung, Jin-Seok	Professor	Ph.D. (Purdue Univ.)	X-ray Physics	chungj@ssu.ac.kr
Yi, Hangmo	Professor	Ph.D. (Univ. of Pennsylvania)	Condensed Matter Physics Theory	hyi@ssu.ac.kr
Lee, Yunsang	Associate Professor	Ph.D. (Seoul National Univ.)	Solid State Spectroscopy	ylee@ssu.ac.kr
Lee, Dong Ryeol	Associate Professor	Ph.D. (POSTECH)	Solid State Physics Experiment	drlee@ssu.ac.kr
Cheoun, Myung Ki	Associate Professor	PH.D. (Tohoku Univ.)	Theoretical Nuclear Physics	cheoun@ssu.ac.kr
Kim, Doris Yangsoo	Associate Professor	Ph.D. (Johns Hopkins Univ.)	Elementary Particle Physics Experiment	dorisykim@ssu.ac.kr
Kim, Nammee	Assistant Professor	Ph.D. (Purdu Univ.)	Theoretical Condensed Matter Physics	nammee@ssu.ac.kr
Choi, Hyunhee	Assistant Professor	Ph.D. (Ewha Womans Univ.)	Optics	hyunheechoi@ssu.ac.kr
Kim, Myeong Su	Emeritus Professor	Ph.D. (Chungang Univ.)	Heat & Fluid Plasma Physics	
Yu, Chong-In	Emeritus Professor	Dr. Sc. (Tohoku Univ.)	Optical Physics	
Ro, Pyung-Syk	Emeritus Professor	Ph.D. (Univ.of New Mexico)	Nuclear Physics	
Koh, Jae Gui	Emeritus Professor	Ph.D. (Soongsil Univ.)	Physics of Magnetism	jgkoh@ssu.ac.kr

Chemistry treats the most central topics of all the sciences. Energy and materials around us are closely related to the areas of Chemistry which are our current research interests called Analytical, Inorganic, Organic, Physical and Biochemistry. Chemistry also contributes to other disciplines such as Bioscience, Materials Science, Medicine, Pharmacology and Physics. Our department is engaged in researches of structures, properties, and reactions of the various organic, inorganic, and biomolecules. These research activities focus on developing applicable molecules or materials which will benefit the health and happiness of mankind. Students are expected to have the abilities to carry out new research works through the educational programs provided by the department.

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## AREAS OF SPECIALIZATION

The aim of the graduate program in Chemistry is to provide an environment for students to develop the skills to become leaders in scientific research and education, capable of making original contributions to the advancement of Chemistry and related disciplines. Currently programs for the M.S. and Ph.D. degree are offered in Analytical, Bio, Inorganic, Organic, and Physical Chemistry.

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## PROGRAM OF STUDY

Our Graduate Program provides students with the opportunity to choose an appropriate curriculum for their specific interests and career plans. Research is the core of the graduate program, and the many research groups, each under the direction of a faculty member, are the basic educational and scholarly units of the department. Therefore, It is the most important to choose a research group appropriate to individual's talents and interests. We also maintain an extraordinarily active seminar program, featuring eminent speakers whose research is at the forefront of science. Inter- or intra- departmental collaborative researches in such interdisciplinary areas as bioanalytical, bioorganic, bioinorganic, chemical biology, materials chemistry, physical organic chemistry, organometallic chemistry, and biophysics are possible.

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## CONTACT INFORMATION

Department of Chemistry

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FAX : 82-2-824-4383

E-mail : chem@ssu.ac.kr

Website : <http://ssu.ac.kr/web/chem/home>

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## COURSES

### Common Courses

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21603015	Advanced Physical Chemistry I
21603016	Advanced Physical Chemistry II
21603017	Advanced Inorganic Chemistry I
21603018	Advanced Inorganic Chemistry II
50229379	Advanced Inorganic Chemistry III
50229381	Advanced Inorganic Chemistry IV
21603019	Advanced Analytical Chemistry I
21603020	Advanced Analytical Chemistry II
21603021	Advanced Organic Chemistry I
21603022	Advanced Organic Chemistry II
21603035	Advanced Organic Chemistry III
50073703	Advanced Organic Chemistry IV
21603033	Advanced Biochemistry I
21603034	Advanced Biochemistry II
50124678	Advanced Biochemistry III
50124679	Advanced Biochemistry IV
21603024	Quantum Chemistry I
21603025	Quantum Chemistry II
21603026	Electrochemical Analysis
21603027	Physical Organic Chemistry I
21603028	Physical Organic Chemistry II
21603030	Research
21603031	Seminar I
21603032	Seminar II

50073706	Seminar III
50124680	Special Topics in Advanced Chemistry I
50124681	Special Topics in Advanced Chemistry II

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## Physical Chemistry

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21603036	Advanced Quantum Chemistry
21603037	Molecular Spectroscopy I
21603038	Molecular Spectroscopy II
21603039	Magnetic Resonance Spectroscopy I
21603040	Magnetic Resonance Spectroscopy II
21603041	Advanced Chemical Thermodynamics
21603042	Combustion Chemistry
21603043	Statistical Thermodynamics I
21603044	Statistical Thermodynamics II
21603045	Chemical Kinetics I
21603046	Chemical Kinetics II
21603047	Theory of Chemical Bonding I
21603048	Theory of Chemical Bonding II
21603049	Topics in Physical Chemistry
21603050	Special Research in Physical Chemistry
21603051	Group Theory
21603052	Physical chemistry Seminar
21603053	Molecular Dynamics
21603054	Molecular Orbital Theory
21603066	Nanostructures
21603056	Chemical Reaction Dynamics
21603067	Quantum Chemistry for Nanosciences
21603068	Microchips
21603065	Applications of Nanomaterials
21603062	Laser Spectroscopy
21603063	Biophysical Chemistry

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## Inorganic Chemistry

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21603072	Coordination Compounds
21603081	Chemical Crystallography
21603082	Solid State Chemistry
21603069	Ligand Field Theory

21603077	Metal Carbonyl Compounds
21603083	Magnetochemistry
21603084	Bioinorganic Chemistry
21603078	Special Topics in Inorganic Chemistry I
21603079	Special Topics in Inorganic Chemistry II

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### Organic Chemistry

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21603070	Stereochemistry
21603087	Organometallic Chemistry
21603088	Synthetic Organic Chemistry I
21603089	Synthetic Organic Chemistry II
21603090	Natural Product Chemistry
21603071	Heterocyclic Chemistry
21603092	Carbohydrate Chemistry I
21603093	Carbohydrate Chemistry II
21603094	Polysaccharide Chemistry
21603097	Organic Mass Spectrometry
21603098	Nuclear Magnetic Resonance Spectroscopy
21603099	Chemistry of Antibiotics
21603100	Environmental Organic Chemistry I
21603101	Environmental Organic Chemistry II
21603105	Special Topics in Organic Chemistry I
21603106	Special Topics in Organic Chemistry II
21603107	Advanced Bio-Organic Chemistry
21603108	Host-Guest Chemistry
21603109	Advanced Polymer Chemistry
21603110	Molecular Recognition Chemistry
21603111	Supramolecular Chemistry I
21603112	Supramolecular Chemistry II
21603113	Medicinal Chemistry
21603116	Combinatorial Chemistry

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### Analytical Chemistry

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21603117	Electrochemistry
21603118	Polarography
21603119	Chromatography
21603120	Spectrophotometric Analysis

## Department of Chemistry

21603121	Atomic Absorption Spectroscopy
21603122	Environmental analysis
21603123	Trace analysis
21603124	Special Topics in Instrumental Analysis
21603125	Chemical Instrumentation
21603126	Optical Analysis
21603127	Special Topics in Analytical Chemistry
21603128	Special Research in Analytical Chemistry I
21603129	Special Research in Analytical Chemistry II

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### Biochemistry Chemistry

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21603131	Special Topics Biochemistry I
21603132	Special Topics Biochemistry II
21603133	DNA Recombinant Technology
21603134	Protein Purification Theory
21603135	Cellular and Molecular Biology
21603136	Cell Signalling
21603137	Protein Structure Analysis
21603138	Structure of Biological Macromolecules

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## DEPARTMENTAL REQUIREMENTS

University regulations require to take more than 24 credits (for M.S degree) or 60 credits (for Ph.D degree), including at least one of common courses such as advanced analytical, advanced inorganic, advanced organic, or advanced physical chemistry. It is also required to pass foreign language examination and a seminar-like oral presentation followed by questions which test the candidate's preparation to do the thesis research. The general examination based on the general knowledge, and a public oral seminar based on their thesis research should be taken. Finally, the department faculty evaluate the thesis, and the student finishes the degree requirements by defending the thesis research in a final oral examination before the Generals Committee.



## MEMBERS OF FACULTY

Name	Position	Degree	Major	E-mail
Paek, Kyung Soo	Professor	Ph.D. (Univ. of California at L.A.)	Organic Chemistry	kpaek@ssu.ac.kr
Shin, Kuan Soo	Professor	Ph.D. (Univ. of Texas at Austin)	Physical Chemistry	kshin@ssu.ac.kr
Chun, Keun Ho	Professor	Ph.D. (Univ. of California at L.A.)	Organic Chemistry	kchun@ssu.ac.kr
Kang, Weekyung	Professor	Ph.D. (KAIST)	Physical Chemistry	wkang@ssu.ac.kr
Joo, Sang Woo	Professor	Ph.D. (Chicago Univ.)	Material, Sensor	sjoo@ssu.ac.kr
Kim, Ja Heon	Professor	Ph.D. (Pohang Univ. of Science and Technology)	Inorganic Chemistry	jaheon@ssu.ac.kr
Yang, Jin Kuk	Associate Professor	Ph.D. (Seoul Natl. Univ.)	Biochemistry	jinkukyang@ssu.ac.kr
Shin, Ik Soo	Assistant Professor	Ph.D. (Seoul Natl. Univ.)	Analytical Chemistry, Electrochemistry	extant@ssu.ac.kr
Bai, Kyusun	Emeritus Professor	Ph.D. (Ohio State Univ.)	Chemistry of Complex	
Yun, Youngja	Emeritus Professor	Ph.D. (Korea Univ.)	Instrumental Anaysis	yjyun@ssu.ac.kr
Nam, Jeong E	Emeritus Professor	Ph.D. (McGill Univ.)	Organic Chemistry	namj@ssu.ac.kr

# Department of Statistics and Actuarial Science

One of the educational missions of the department is to foster students who are capable of analyzing statistical information in various areas of application as well as pursuing excellence in the research of statistics. Actuarial science program of the department aims to prepare students for careers in the actuarial profession or related areas by emphasizing the theory that underlies risk processes and applications of this theory to problems of insurance and financial fields. To achieve these missions, the department provides solid degree programs and excellent instruction in statistics and actuarial science.

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Natural Science

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## AREAS OF SPECIALIZATION

### Statistics

Statistics is the scientific application of mathematical principles to real world problems of uncertainty. It is about the collection, analysis, presentation, and the interpretation of numerical data. Statisticians contribute to the process of rational decision making by applying their mathematical and statistical knowledge to the design of surveys and experiments.

### Actuarial Science

Actuarial science is the application of mathematical and statistical methods to assess risk in insurance and finance industries. It covers various topics on risk associated with insurance operations such as pension mathematics, rate making, mortality study, risk management, and financial engineering. After completing required course work, students may deepen their knowledge about specific areas under independent supervision and can prepare for professional actuarial exams offered in various countries. Also, students have opportunities to prepare for the core issues of the insurance industry by attending department colloquiums.

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## CONTACT INFORMATION

Department of Statistics and Actuarial Science

TEL : 82-2-820-0440

FAX : 82-2-823-1746

E-mail : [stat@ssu.ac.kr](mailto:stat@ssu.ac.kr)

Website : <http://stat.ssu.ac.kr>

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## COURSES

### Common Courses

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21603203	Mathematical Statistics I
21603205	Stochastic Processes I
21603245	Multivariate Statistical Analysis I
21603246	Time Series Analysis
21603212	Linear Models I
21603215	Mathematical Statistics II
21603224	Linear Models II
21603233	Survival Analysis
21603242	Seminar in Statistics I
21603243	Seminar in Statistics II
21603244	Seminar in Statistics III

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### Statistics

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21603204	Probability Theory I
21603206	Regression Analysis
21603207	Experimental Design
21603209	Sampling Theory
21603211	Nonparametric Statistics
21603213	Statistical Consulting I
21603214	Statistical Consulting II
21603216	Probability Theory II
21603217	Stochastic Processes II
21603218	Statistical Decision Theory
21603219	Testing Statistical Hypotheses
21603220	Asymptotic Theory
21603221	Seminar in Theoretical Statistics I
21603222	Seminar in Theoretical Statistics II
21603223	Statistical Computing I
21603225	Nonlinear Model
21603226	Applied Probability Theory I
21603227	Applied Probability Theory II
21603231	Seminar in Applied Statistics I
21603232	Seminar in Applied Statistics II
21603234	Optimization Theory

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21603235	Bayesian Statistics
21603236	Multivariate Statistical Analysis II
21603237	Times Series Analysis II
21603238	Statistical Computing II
21603239	Information Theory
21603240	Statistical Quality Control
21603241	Data Mining

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## Actuarial Science

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21603267	Life Actuarial Mathematics I
21603268	Life Actuarial Mathematics II
21603269	Loss Models I
21603253	Principles of Insurance
21603247	Seminar in Actuarial Statistics I
21603255	Pension Mathematics
21603248	Financial Mathematics I
21603264	Financial Mathematics II
21603270	Loss Models II
21603258	Seminar in Actuarial Statistics II
21603259	Financial Econometrics
21603260	Financial Risk Management
21603262	Asset Liability Management
21603263	Financial Engineering
21603265	Life Insurance Product Development
21603266	Actuarial Science for Health Insurance
50084019	Stochastic Calculus for Finance
50235478	Actuarial Practice I
50235479	Actuarial Practice II
50235480	Principles of Social Insurance
50235481	Actuarial Management I
50235482	Actuarial Management II
50349917	Non-Life Actuarial Mathematics I

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## DEPARTMENTAL REQUIREMENTS

### Statistics

- 1st Semester : Mathematical Statistics I, Financial Mathematics I, Regression Analysis  
2nd Semester : Linear Models I, choices of two out of three; Multivariate Statistical Analysis I, Statistical Computing I and Stochastic Processes I.  
3rd Semester : Data Mining, choice of one out of two; Time Series Analysis I and Bayesian Statistics.

### Actuarial Science

- 1st Semester : Mathematical Statistics I, Financial Mathematics I, Non-Life Actuarial Mathematics I  
2nd Semester : Financial Mathematics II, Life Actuarial Mathematics I, Non-Life Actuarial Mathematics II  
3rd Semester : Life Actuarial Mathematics II, choices of two out of following courses; Principles of Insurance, Financial Econometrics, Seminar in Actuarial Statistics I&II, Life Insurance Product Development, Pension Mathematics, Actuarial Science for Health Insurance, etc.

## MEMBERS OF FACULTY

Name	Position	Degree	Major	E-mail
Lee, Jung-Jin	Professor	Ph.D. (Case Western Reserve Univ.)	Statistical Computing, Time Series	jilee@ssu.ac.kr
Kang, Gunseog	Professor	Ph.D. (Univ. of Wisconsin-Madison)	Nonlinear Models	gskang@ssu.ac.kr
Kim, Ji-Hyun	Professor	Ph.D. (Florida State University)	Survival Analysis	jxk61@ssu.ac.kr
Lee, Chang-Soo	Professor	Ph.D. (Univ. of Iowa)	Actuarial Science, Time Series Analysis	cslee@ssu.ac.kr
Kim, Sung-Chul	Professor	Ph.D. (Univ. of California, Berkeley)	Bayesian Analysis Decision Analysis	sckim@ssu.ac.kr
Kwon, Hyuk-Sung	Associate Professor	Ph.D. (Univ. of Western Ontario)	Actuarial Science	hskwon@ssu.ac.kr
Ko, Bangwon	Associate Professor	Ph.D. (Univ. of Iowa)	Actuarial Science, Financial Risk Management	bko@ssu.ac.kr
Cho, Sang-Hoon	Associate Professor	Ph.D. (Univ. of Wisconsin-Madison)	Biostatistics, Bioinformatics	sanghcho@ssu.ac.kr

# Department of Bioinformatics and Life Science

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Natural Science

Bioinformatics is an integrative science which combines biotechnology and information science. The Department of Bioinformatics and Life Science at Soongsil University was founded in 2001 as the first bioinformatics department in Korea, and the graduate program was established in 2005. The educational goal of our department is to train students as interdisciplinary specialists who can utilize informatics tools to analyze vast amount of data in biology, thereby obtaining knowledge that contributes to human welfare.

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## AREAS OF SPECIALIZATION

The graduate program in the Department of Bioinformatics and Life Science provides both Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. A student can major in either Bioinformatics or Life Science. Regardless of their majors, the students are expected to take multiple courses in biology and informatics to obtain knowledge necessary for becoming a successful interdisciplinary scientist. In particular, a student in the Ph.D. course is trained to be an independent researcher who can set the direction of their own research.

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## PROGRAM OF STUDY

Lectures mainly take place in class including the weekly seminars given by the invited speakers. Courses are evaluated by various methods such as written examinations, reports, presentations, and assessed coursework. Both M.S. and Ph.D. candidates are required to write a thesis for the fulfillment of their graduation. In addition, Ph.D. candidates are expected to publish their works in scientific journals.

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## CONTACT INFORMATION

Department of Bioinformatics and Life Science

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## COURSES

### Common Courses

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21603282	Molecular Cell Biology I
21603283	Molecular Cell Biology II
21603284	Bioinformatics I
21603285	Bioinformatics II
21603286	Colloquium in Bioinformatics I
21603287	Colloquium in Bioinformatics II
50084101	Colloquium in Bioinformatics III
50059031	Colloquium in Bioinformatics IV
21603288	Research I
50072766	Research II
50106030	Research III
50120280	Research IV
21603289	Seminar I
21603290	Seminar II
21603292	Seminar III
50072762	Seminar IV

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### Life Science

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21603293	Post-Genome Biology I
21603294	Post-Genome Biology II
21603295	Advanced Molecular Genetics
21603296	Techniques in Molecular Biology
21603297	Signal Transduction and Protein Network
21603298	Redox Regulation in Biology
21603299	Protein Engineering
21603300	Advanced Biochemistry
21603301	Special Topics in Structural Biology
21603302	Molecular Medicine
21603303	Topics in Biotechnology
21603304	Special Lectures of Immunology
21609508	Advanced Immunology
50072758	Molecular Medical Science
50086779	Topics in Biomedical Sciences
50227319	Seminars in Cellular Immunology
50124253	Macromolecular Crystallography



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20120278	Synthetic Biology
50276105	Analysis of Chemical Big data
50391382	Fungal Biology
50298674	Readings in Synthetic Biology
50298675	Advanced BIT Interdisciplinary Special Lecture IV
50315769	Applied Mycology
50324172	Bio–medical Engineering I
50324170	Advanced Molecular Biology
50374030	Bioindustrialization Strategy

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## Bioinformatics

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21603305	Biological Database
21603306	Web Programming
21603307	Computational Genomics
21603308	Computational Proteomics
21603309	Pattern Recognition
21603310	Current Topics in Bioinformatics
21603311	Cheminformatics and Drug Design
21603312	Computer Simulation
21603313	Protein Structure Prediction and Global Optimization
21603314	Advanced Computational Molecular Biology
21603315	Biocomputing
21603316	Material Design
21603317	Pharmacokinetics
21603318	Structural Bioinformatics
50084099	Statistical Genetics
50084100	Statistical Methods
50107147	Advanced Population Genetics
50107148	Advanced Chemoinformatics
50124763	Advanced Genome Analysis
50234748	Computer–Aided Drug Discovery
50247764	Introduction to tumor biology
50269362	Advanced BIT Interdisciplinary Special Lecture I
50276347	Advanced BIT Interdisciplinary Special Lecture II
50276106	Genomic data analysis for complex traits
50276107	Genome data mining I
50276108	Analysis of Chemical Big data
50291379	Genome data mining II
50291381	Advanced BIT Interdisciplinary Special Lecture III
50373824	Topics in Pharmacogenomics
50374027	genomic data science

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## DEPARTMENTAL REQUIREMENTS

Courses should be taken from three major courses (common course, life science, and bioinformatics) opened each semester.

Candidates for M.S. should take 24 credits over 4 semesters.

Candidates for Ph.D. should take 36 credits over 4 semesters.

Students for the combined M.S. & Ph. D. program should take 60 credits over 8 semesters.

## MEMBERS OF FACULTY

Name	Position	Degree	Major	E-mail
Lim, Dongbin	Professor	Ph.D. (New York University)	Proteomics, Molecular Genetics	dblim@ssu.ac.kr
Lee, Chaeyoung	Professor	Ph.D. (Cornell University)	Statistical Genetics	clee@ssu.ac.kr
Shin, Hang-Cheol	Professor	Ph.D. (University of Sydney)	Protein Engineering, Protein Design, Biochemistry	hcshin@ssu.ac.kr
Kim, Sangsoo	Professor	Ph.D. (Iowa State University)	Bioinformatics, Structural Biology	sskimb@ssu.ac.kr
Lee, Julian	Professor	Ph.D. (Brown University)	Biophysics, Protein-folding	jul@ssu.ac.kr
Cho, Kwang-Hwi	Professor	Ph.D. (Cornell University)	Bioinformatics, Molecular Design	chokh@ssu.ac.kr
Kim, Mi-Yeon	Associate Professor	Ph.D. (University of Birmingham)	Cellular Immunology, Microbiology	kimmy@ssu.ac.kr
Park, SangYoun	Associate Professor	Ph.D. (Cornell University)	Structural Biology, Biophysical Chemistry	psy@ssu.ac.kr