

College of Knowledge-Based Services Engineering
Department of Biotechnology
At Sungshin Women's University





Department Introduction

The Department of Biotechnology at Sungshin Women's University educates students on the principles of life phenomena in various living organisms. It imparts knowledge and skills applicable to the biotechnology industry. Based on fundamental life science knowledge, the department designs and operates its curriculum to cultivate female engineering talent equipped with the creative expertise necessary for developing and producing future vital industries such as biopharmaceuticals, stem cells, industrial microorganisms, and biological resources. The main educational goal is to nurture practical professionals in the field of biotechnology through direct experience and verification of theoretical knowledge learned from textbooks via experiments and practical courses. Biotechnology is expected to be a core area of the Fourth Industrial Revolution, with a continuous increase in workforce demand across various industries. The curriculum of the Department of Biotechnology is structured to enable students to work as biotechnology experts in diverse fields. Graduates take on roles in biopharmaceutical development, drug production/quality control, antibody/cell therapy research, ART/regeneration research, pharmaceutical sales in biotechnology-related companies and government research institutes, and specialize in areas such as conservation and utilization of biological resources, biosecurity and forensic science, pharmaceutical research, management of model animals, food and drug management and research, medical device management and research, and microbial-based biomanufacturing industry. Additionally, many undergraduates continue their education in graduate school, pursuing advanced research in biotechnology and life sciences, thus broadening their opportunities for professional advancement in various fields.

Educational Goals

The Department of Biotechnology aims to cultivate creative female engineering talents who will lead the future biotechnology industry and produce life scientists capable of deeply exploring life phenomena. Furthermore, it aims to nurture creative talents with self-directed problem-solving abilities and educate practical professionals in the field by providing a balanced education in theoretical and experimental courses.

Ideal Candidate

The Department of Biotechnology seeks to develop creative and innovative female engineers with a profound theoretical understanding and practical skills in biotechnology. Such talents are expected to lead the development of the future biotechnology industry and play pivotal roles in various fields



Professors



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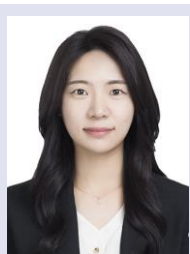
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Lee Jaewon, PhD

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Curriculum

Freshman >>>

Department	Completion Type	Course Title (Course Code)	Schedule	Semester	Credit
Department of Biotechnology	Primary	General Biology Lab 1(LG000200)	Annual	First	2
Department of Biotechnology	Primary	General Biology Lab 2(LG000500)	Annual	Second	2
School of Creativity and Convergence Studies	Core	Critical Thinking and Discussion(SA011100)	Annual	First	3
School of Creativity and Convergence Studies	Core	Creative thinking and writing(SA011200)	Annual	Second	3
College of Knowledge-Based Services Engineering	Core	Python Programming for Scientists(SA046600)	Annual	Second	3
School of Mathematics, Statistics and Data Science	Core	Introduction to Calculus and Vector Analysis (SA045900)	Annual	First	3
School of Mathematics, Statistics and Data Science	Core	Advanced Mathematics for Natural Sciences (SA046000)	Annual	Second	3
School of Chemistry and Energy	Distribution	General Chemistry I (SB030300)	Annual	First	3
School of Chemistry and Energy	Distribution	General Chemistry II (SB030400)	Annual	Second	3
Department of Biotechnology	Distribution	General Biology I (SB030500)	Annual	First	3
Department of Biotechnology	Distribution	General Biology II (SB030600)	Annual	Second	3
Career Development Team	Career	Career Exploration by Major(SS010000)	Annual	First	1



Curriculum

Sophomore >>>

Department	Completion Type	Course Title (Course Code)	Schedule	Semester	Credit
Department of Biotechnology	Primary	Biochemical Engineering Calculations (LG000700)	Annual	First	3
Department of Biotechnology	Primary	Cell Biology(LG000800)	Annual	First	3
Department of Biotechnology	Primary	Plant Systematics(LG000900)	Annual	First	3
Department of Biotechnology	Primary	Introduction to Biologics(LG001100)	Annual	Second	3
Department of Biotechnology	Primary	Plant Systematics Lab(LG001200)	Annual	First	2
Department of Biotechnology	Primary	Ecology(LG001400)	Annual	Second	3
Department of Biotechnology	Primary	Anatomy and Histology(LG001600)	Annual	Second	3
Department of Biotechnology	Primary	Molecular Biology(LG001700)	Annual	Second	3
Department of Biotechnology	Primary	Microbiology(LG002400)	Annual	Second	3
Department of Biotechnology	Primary	Introduction to Computational Biology (LG002900)	Annual	First	3
Department of Biotechnology	Primary	Medical Genetics(LG004200)	Annual	Second	3



Curriculum

Junior >>>

Department	Completion Type	Course Title (Course Code)	Schedule	Semester	Credit
Department of Biotechnology	Advanced	Bioprocess Engineering(LG001300)	Annual	First	3
Department of Biotechnology	Advanced	Genetic Engineering(LG001500)	Annual	First	3
Department of Biotechnology	Advanced	Animal Physiology(LG001900)	Annual	First	3
Department of Biotechnology	Advanced	Biostatistics(LG002000)	Annual	First	3
Department of Biotechnology	Advanced	Microbial Genetic Engineering Lab(LG002200)	Annual	Second	2
Department of Biotechnology	Advanced	Molecular Phylogenetics(LG002500)	Annual	Second	3
Department of Biotechnology	Advanced	Development Engineering(LG002600)	Annual	Second	3
Department of Biotechnology	Advanced	Cell Culture Process Lab(LG003800)	Annual	Second	2



Curriculum

Senior >>>

Department	Completion Type	Course Title (Course Code)	Schedule	Semester	Credit
Department of Biotechnology	Advanced	Conservation Biology(LG003100)	Annual	First	3
Department of Biotechnology	Advanced	Stem Cell Engineering(LG003200)	Annual	First	3
Department of Biotechnology	Advanced	Creative Research in Biotechnology 1 (LG003300)	Annual	First	3
Department of Biotechnology	Advanced	Development Engineering Lab(LG003400)	Annual	First	2
Department of Biotechnology	Advanced	Bioinformatics(LG003500)	Annual	Second	3
Department of Biotechnology	Advanced	Instrumental Analysis for Bioengineering (LG003600)	Annual	First	3
Department of Biotechnology	Advanced	Bioinformatics Lab(LG003700)	Annual	Second	2
Department of Biotechnology	Advanced	Creative Research in Biotechnology 2 (LG003900)	Annual	Second	3
Department of Biotechnology	Advanced	Reproductive physiology and Assisted reproductive technology(LG004000)	Annual	Second	3
Department of Biotechnology	Advanced	Evolutionary Biology(LG004100)	Annual	First	3
Department of Biotechnology	Advanced	Laboratory Animal Medicine(LG004400)	Annual	First	3
Department of Biotechnology	Advanced	Tissue Engineering(LG004500)	Annual	Second	3



Biologics Track



Track Description

This track is designed to cultivate experts in the field of biologics, with a focus on meeting the workforce demands of the industry. Students involved in the development and research of biopharmaceuticals are recommended to pursue graduate studies.

Related Major Competencies

Research proficiency, Communication skills

Specialized Career Paths

Biological development, Pharmaceutical production management, Pharmaceutical quality management, Pharmaceutical marketing

Curriculum

Area	Semester	Course Title	Credit
2	1	Biochemical Engineering Calculations	3
2	2	Introduction to Biologics	3
3	1	Bioprocess Engineering	3
3	1	Genetic Engineering	3
4	1	Immunology	3
4	1	Creative Research in Biotechnology 1	3
3	2	Cell Culture Process Lab	2
4	2	Creative Research in Biotechnology 2	3
2	2	Medical Genetics	3

Bioinformatics and ecology track



Track Description

This track is designed to cultivate experts in the fields of biological information, taxonomy, and environmental ecology. The goal is to meet the workforce demands of research institutes and industries, with a focus on encouraging specialized research personnel to pursue graduate studies

Related Major Competencies

Research expertise, global mindset, communication skills

Specialized Career Paths

Biological information, ecosystem restoration management, water quality environmental technology, forestry/agricultural environmental research, wildlife ecology restoration, health hygiene and environmental monitoring, climate change research, etc.

Curriculum

Area	Semester	Course Title	Credit
2	1	Plant Systematics	3
2	2	Ecology	3
2	1	Introduction to Computational Biology	3
3	1	Biostatistics	3
3	2	Molecular Phylogenetics	3
4	1	Conservation Biology	3
4	2	Bioinformatics	3
4	2	Bioinformatics Lab	2
4	1	Creative Research in Biotechnology 1	3
4	2	Creative Research in Biotechnology 2	3

Biomedical Track



Track Description

This track is designed to cultivate experts in healthcare management, antibody and cell therapy research and management, and health promotion management. The goal is to meet the workforce demands of research institutes and industries in the veterinary medicine field

Related Major Competencies

Research proficiency, Communication skills

Specialized Career Paths

Healthcare-related administrators, health promotion researchers, veterinary medicine researchers, etc.

Curriculum

Area	Semester	Course Title	Credit
2	2	Anatomy and Histology	3
2	1	Cell Biology	3
4	1	Immunology	3
3	1	Animal Physiology	3
3	2	Development Engineering	3
4	1	Stem Cell Engineering	3
4	1	Development Engineering Lab	2
4	2	Reproductive physiology and Assisted reproductive technology	3
4	1	Creative Research in Biotechnology 1	3
4	2	Creative Research in Biotechnology 2	3



SUNGSHIN

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