Dept. of Bio & Fermentation Convergence Technology

The Department of Bio & Fermentation Convergence Technology systematically educates students by providing a curriculum that combines advanced major fields and applied technologies to foster advanced researchers with advanced knowledge and skills related to the search, discovery, and development of functional biomaterials for medicine, food, beauty, and industrial use by combining advanced biotechnology. In addition, the Department of Biofermentation and Convergence not only operates joint education and research exchange programs with leading research groups at core national research institutes and prestigious universities overseas, but also operates various education and research exchange programs linked to the country's sustainable growth policies.
Through such multidisciplinary and international education and research programs, the Department of Biofermentation and Convergence is fostering future-oriented professionals with global and professional capabilities to grow into core personnel for domestic and foreign companies in the bio sector, government-funded research institutes, and government ministries, and is fostering bio start-up and venture entrepreneurs with creative capabilities.

☐ **Courses**

❑ **Bio and Fermentation Convergence Technology Major Courses**

· **Advanced Biochemistry (3)**

This subject studies the bio-chemical process in living organisms. It deals with the structure and function of cellular components and metabolism such as bio-molecules, amino acids, peptides, proteins, carbohydrates, lipids, and nucleic acids.

· **Advanced Biotechnology (3)**

This course covers the recent research trend and technology in the area of bio informatics, gene cloning, construction of genetically modified microorganisms, production of recombinant enzymes in microbial systems and kinetic analysis of recombinant enzymes.

· **Seminar in Fermentation Fusion Science and Technology I (3)**

Course on the scientific writing and presentation for research management, thesis and paper

· **Seminar in Fermentation Fusion Science and Technology II (3)**

Course on the scientific writing and presentation for research management, thesis and paper

· **Advanced Immunology (3)**

Studies and discuss on the current research trend in cells and biomecules that constitute an immune system and their physiological function, and in the development of new immune materials and vaccine.

· **Current Topics in Bioprocess Engineering (3)**

Course on the industrialization techonology of biological materials including fermentation and purification and bioprocess

· **Advanced Bioenergy Engineering (3)**

Course on the basics and application of bio-energy. It pursues the understanding of various bio-energetical understanding for sustainable economy

· **Studies on Fungi (3)**

Studies and discuss on the current research trend in physiology, metabolism, genetics, and industrial application of fungi.

· **Special Topics in Metabolic Engineering (3)**

Studies on the basic principles and applications of metabolic engineering for efficient production of value-added biochemicals by modulation of metabolic pathways.

· **Current Topics in Bio Medicinal Materials (3)**

Advanced course on the understanding, manufacturing, and regulation for biological drug candidates. It also includes industrialization of biological drug candidates

· **Special Topics in Medicinal Biotechnology (3)**

This lecture covers the state-of-art of the development, evaluation and mass production of new medicinal materials through in-depth understanding of human diseases.

· **Advanced Physiology (3)**

Homeostasis refers to stability, balance or equilibrium. It is the body's attempt to maintain the stability of the human body's internal environment in response to changes in external conditions. Nervous System, Endocrine System, Cardiovascular System, Digestive System, Respiratory System and Circulatory System will be studied.

· **Advanced Systems Biology (3)**

Inter-disciplinary field of study that focuses on complex interactions within biological systems, using a more holistic perspective approach to biological and biomedical research.

· **Advanced Molecular Biology (3)**

Studies and discuss on the current research trend in replication, transcription, translation, gene expression, regulation, chromatin structure at molecular level.

· **Advanced Cell Biology (3)**

Studies and discuss on the current research trend in cell structure, organell function, cellular signaltransduction, and tumorigenesis at molecular level.

· **Advanced Neuroscience (3)**

The nervous system -the brain, spinal cord, and nerves of the body-is crucial for life and enables you to sense, move, and think. General knowledge in neurobiology, sensory and motor systems, the brain and behavior, and the cellular and molecular basis of learning and memory will be studied.

· **Research in Fermentation Convergence Technology (3)**

Researches by convergence of fermentation technology and emerging biotechnology.

· **Research in Eco-Biomaterial Development (3)**

Course on the identification, development, analysis, and application of materials from organisms

· **Research in Eco-Biomaterial Production (3)**

Course on the mass production of biological materials including recombinant technology, gene analysis, development of production strain, purification of product and hybrid technologies

· **Advanced microbiology (3)**

Studies and discuss on the current research trend in the nutrition, growth, metabolism, physiology, molecular genetics, genomes of diverse microorganisms.

· **Special topics in Functional Food and Biomedicinal Materials for Eco-Bio (3)**

Course on the hybrid technology including biosensor, diagnosis technology, U-healthcare system for human health care

· **Business model for Eco-Biomaterials (3)**

Course on the establishment and operation of bio-business including biological technology management, accounting and marketing

· **SMILE: Smart Merging Interlab Education (3)**

Based on the integrated collaborative research environment, we intend to run Smart Merging InterLab Education (SMILE) program to cultivate biomedical human resources

by cultivating integrated knowledge of biomedical medicine through organic linkage of knowledge and technology between labs.

· **Current Topics in Enzymology (3)**
This subject studies general properties of enzyme reactions such as enzyme activity, substrate specificity, and enzyme catalysis.

· **Current Topics in Advanced Bionanomaterials (3)**
Course on the industrialization of bionano materials including their current progress, application and industrialization

· **Current Topics in Bio and Medicinal New Materials (3)**
Studies and discuss on the current research trend in pharmaceutical and medical applications.

· **Current Topics in Eco-Biomaterial Fusion Research I (SMILE-MAX) (3)**
Course of interdisciplinary research theme learning food material, medicinal lead compounds, and their development

· **Current Topics in GMP and Instrumental Analysis (3)**
Course on the understanding the concept of GMP and analysis of biological materials produced by GMP process. It also introduces the current technology and their principles

· **Current Topics in Industrial Practice (3)**
Course on the practical research duties including statistical analysis, patent writing, SOP writing, and experimental design

· **Current Topics in Eco-Biomaterial Fusion Research II (SMILE-MAX) (3)**
Course of interdisciplinary research theme learning food material, medicinal lead compounds, and their development

· **Big data and Artificial Intelligence (3)**
Course on the collection and analysis of biological bigdata as well as the utilization as input data for machine learning

☐ Faculty Members

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