Curriculum Policy of the Graduate School of Engineering

Graduate School of Engineering:

Several specific study goals have been established based on the Degree Awarding Policy of the Graduate School of Engineering, to help students cultivate “Enriched Humanity”, “creativity”, “International Awareness”, and “expertise”. The following curricula have been organized in order to achieve those goals, which is aimed at consistent education in the Master’s and Doctoral programs.

Department name: Architecture
School name: Graduate School of Engineering

Curriculum organization and implementation system where the students can reach the study goals set in the Degree Awarding Policy of the Graduate School of Engineering by taking the provided courses

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Enriched Humanity	To acqure high ethical standards	○Professional Practice I	○Evacuation for Build Environment ○Safety Planning for Urban Architectural Environment ○Professional Practice I	○Professional Practice I	○Professional Practice I		
	To acquire a solid understanding of the impact of science and technology on society	○Professional Practice I ○Professional Practice II	○Professional Practice I ○Professional Practice II ○Professional Practice III	○Professional Practice I ○Professional Practice II	○Professional Practice I ○Professional Practice II ○Professional Practice III		
	To acquire the ability to take appropriate actions	○Special Subject Exercise	○Special Subject Exercise	○Special Subject Exercise	○Special Subject Exercise		
Creativity	To maintain the liberal and open-minded culture	○Special Subject Exercise	○Special Subject Exercise	○Special Subject Exercise	○Special Subject Exercise		
	To acquire the ability to solve issues in a creative manner	◎Advanced Exercise of Architectural Design and Planning ○Professional Practice II ○Master's Thesis	○Professional Practice II ○Professional Practice III ○Master's Thesis	○Master's Thesis ○Professional Practice II	○Master's Thesis ○Professional Practice II ○Professional Practice III	○Master's Thesis	○Master's Thesis ◎Theory of Architectural Philosophy
International Awareness	To acquire the ability to conduct exchanges with overseas partners		○Disaster Prevention in Structural Engineering	○Master's Thesis	○Master's Thesis	○Theory of Structures' Failure ○Master's Thesis	○Master's Thesis
	To acquire the deep understanding of other cultures	○European Architecture and Urban History					○History and Philosophy of Western Architecture
	Ability to exhibit individuality	○Master's Thesis	○Master's Thesis				

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Expertise	To acquire the highly specialized knowledge	◎European Architecture and Urban History ◎Town Planning Constitution ◎Planning and Regeneration Policy for Residential Environment ◎Mechanics of Framed Structures ○Computational Mechanics Ⅰ ○Computational Mechanics Ⅱ ◎Systems Theory of Building Structures ◎Analysis and assessment of sound environment in buildings ◎Environmental Service Systems ◎Architectural Thermal Environmental Engineering ◎Architectural Environmental Systems	◎Japanese Architecture and Urban History ◎Evacuation for Build Environment ◎Safety Planning for Urban Architectural Environment ◎Advanced Steel Structures ○Computational Mechanics Ⅲ ◎Design of Structural Space ◎Planning Theory of Building Structures ◎Dynamics of Building Structures ◎Disaster Prevention in Structural Engineering ◎Urban Environmental Systems ◎Theoretical analysis of sound environment in buildings	◎Townscape Deveropment ◎Regional Planning and Management ◎Analysis of Structures ◎Structural Dynamics and Earthquake Resistant Design			
	To acquire a Wide-ranging insights	◎Advanced Science and Technology Ⅰ ◎Advanced course on interdisciplinary Engineering A ◎Advanced course on interdisciplinary Engineering B ◎Advanced course on interdisciplinary Engineering C	◎Architectural and Environmental Design ◎Built Environmental Design ◎Theory of Built Environmental Planning			◎Advanced Science and Technology Ⅱ ◎Advanced course on interdisciplinary Engineering A ◎Advanced course on interdisciplinary Engineering B ◎Advanced course on interdisciplinary Engineering C	
	To acquire basic academic abilities to resolve issues from a broad perspective	◎Advanced Applied Math. Ⅰ ◎Computational Mechanics Ⅰ ◎Computational Mechanics Ⅱ	◎Advanced Applied Math. Ⅱ	◎Advanced Applied Math.Ⅲ	◎Advanced Applied Math.Ⅳ		
	To acquire practical skills and creativity to resolve issues from a broad perspective	◎Architectural Seminar Ⅰ ○Advanced Exercise of Architectural Design and Planning ◎Professional Practice Ⅰ ◎Professional Practice Ⅱ	◎Architectural Seminar Ⅱ ◎Exercise on Structural Design ◎Professional Practice Ⅰ ◎Professional Practice Ⅱ ◎Professional Practice Ⅲ	◎Architectural Seminar Ⅲ ◎Structural Design Seminar ◎Professional Practice Ⅰ ◎Professional Practice Ⅱ	◎Architectural Seminar Ⅳ ◎Structural Design Seminar ◎Professional Practice Ⅰ ◎Professional Practice Ⅱ ◎Professional Practice Ⅲ	◎Planning Theory of Dwelling SpacePlanning Theory of Dwelling Space ◎Planning Theory of Built Environment	◎Theory of Design for Architectural Environment ◎Theory of Environmental Formation and Design
	To acquire advanced and superior expertise	◎Special Subject Exercise ◎Master's Thesis	◎Special Subject Exercise ◎Master's Thesis	◎Special Subject Exercise ◎Master's Thesis	◎Special Subject Exercise ◎Master's Thesis	◎Disaster Mitigation Management ◎Design Theory of Spatial Systems ◎Theory of Structural Failure Control ◎Structural Design of Spatial Structures ◎Earthquake Resistant Structural Analysis ◎Function Theory of Spatial Systems ◎Spatial Hearing Noise Control Engineering ◎Thermal Environmental Engineering in Urban Areas	◎History and Philosophy of Western Architecture ◎Planning and Design of Urban Space Planning Theory of Safer Urban Built Environment ◎Composition of Structural Members ◎Analysis of Spatial Structures ◎Theory of Structures' Stability ◎Sesmic Hazard Analysis ◎Creation Theory of Spatial Systems ◎Thermal Environmental Planning in Buildings ◎Environmental Planning Based on Human Response ◎Thermal Environmental Planning in Urban Areas
	To acquire in-depth knowledge to work as researchers in their respective fields of specialty					◎Master's Thesis	◎Master's Thesis

Department name:Civil Engineering
School name: Graduate School of Engineering
Curriculum organization and implementation system where the students can reach the study goals set in the Degree Awarding Policy of the Graduate School of Engineering by taking the provided courses

Degree Awarding	Learning goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Enriched Humanity	To acquire high ethical standards	◎Urban Environment Management	◎Advanced Lecture I	○Master's Thesis	○Master's Thesis	○Design of Soil Structures and Foundations	
	To acquire solid understanding of the impact of science and technology on society	○Management of River Catchment ○Environmental Limnology ◎Advanced Science and Technology I, Ⅱ	○Advanced Hydraulics ○Transport System Engineering ○Regional Economics System Analysis	◎Advanced Science and Technology I, Ⅱ		○Limnological Environment ◎Advanced Science and Technology I, Ⅱ	○Analysis of Hydrospheric Environments ○Space-Time Analysis of Travel Behaviour
	To acquire the ability to take appropriate action		○English for Civil Engineering			○Advanced Theory of Socio-Economic Systems	
Creativity	To maintain the liberal and open-minded culture		○Advanced Lecture I	○Special Subject Exercise	○Special Subject Exercise	○Design of Soil Structures and Foundations	
	To acquire the ability to resolve problems in a creative manner	○Advanced Soil Mechanics I ○Advanced Bridge Engineering ○Environmental Geotechnics ○Advanced Course in Ground Disaster Prevention Ⅰ ○Urban Environment Management	○Advanced Course in Foundation Engineering ○Advanced Course in Ground Disaster Prevention II ○Hydraulic System of River Basins ○Environment and Disaster Prevention in Coastal Zone ○Decision Theory under Uncertainty ○Regional Economics System Analysis	◎Master's Thesis	◎Master's Thesis	○Vibration Theory of Spatial Structures ○Geo-Hydraulics ○Ground Disaster Prevention	○Adaptive Structural Control ◎Geomechanics for Underground Structures ○Water Resources Management ○Theory of Transportation System Planning
International Awareness	To acquire the ability to conduct exchanges with overseas partners	○Advanced Rock Mechanics	◎English for Civil Engineering			○Underground Spatial Structure ○Advanced Theory of Socio-Economic Systems	○Water Resources Management
	To acquire an understanding different cultures	○Urban Environment Management	○English for Civil Engineering				
	To acquire the ability to exhibit individuality		○Environment and Disaster Prevention in Coastal Zone ○Advanced Lecture I	○Special Subject Exercise	○Special Subject Exercise	○Regional Geofluid Mechanics	
	To acquire the highly specialized knowledge	◎Advanced Applied Math.IV ○Advanced Geomaterial Mechanics ◎Advanced Soil Mechanics I ◎Advanced Course in Ground Disaster Prevention Ⅰ ○Management of River Catchment ◎Advanced Rock Mechanics ◎Advanced Bridge Engineering ◎Environmental Limnology ◎Advanced Urban Environmental Planning ◎Advanced Concrete Engineering ◎Advanced Mechanics of Fluid Flows	◎Advanced Applied Math.III ◎Advanced Course in Foundation Engineering ◎Advanced Hydraulics ◎Advanced Mechanics of Structural Concrete ○Hydraulic System of River Basins ◎Environment and Disaster Prevention in Coastal Zone ◎Transport System Engineering ◎Regional Economics System Analysis			○Vibration Theory of Spatial Structures ○Geo-Hydraulics ◎Instability and Stabilization of Cut, Filled and Reclaimed Land ○Regional Geofluid Mechanics ◎Underground Spatial Structure ◎Limnological Environment	○Adaptive Structural Control ◎Analysis of Hydrospheric Environments ○Management of Coastal Environments ◎Water Resources Management ◎Space-Time Analysis of Travel Behaviour ◎Structural Diagnostics ◎Theories on Hydraulic Planning

Degree Awarding	Learning goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Expertise	To acquire wide-ranging insights	○Advanced Rock Mechanics ○Advanced Course in Ground Disaster Prevention Ⅰ	○Earthquake Engineering ◎Hydraulic System of River Basins ◎Advanced Soil Mechanics Ⅱ	◎Special Subject Exercise	◎Special Subject Exercise	○Underground Spatial Structure ○Ground Disaster Prevention ◎Doctor's Thesis	○Geomechanics for Underground Structures ○Management of Coastal Environments ◎Doctor's Thesis
	To acquire basic academic abilities to resolve issues from a broad perspective	◎Advanced Geomaterial Mechanics ○Advanced Soil Mechanics Ⅰ ◎Management of River Catchment ○Environmental Geotechnics ◎Computational Mechanics Ⅰ, Ⅱ ○Advanced Concrete Engineering	○Advanced Course in Foundation Engineering ○Advanced Course in Ground Disaster Prevention Ⅱ ◎Computational Mechanics Ⅲ ◎Decision Theory under Uncertainty				
	To practical skills and creativity to resolve issues from a broad perspective	◎Environmental Geotechnics ○Advanced Bridge Engineering ○Computational Mechanics Ⅰ, Ⅱ ○Environmental Limnology ○Advanced Science and Technology Ⅰ, Ⅱ ○Advanced Urban Environmental Planning ○Advanced Concrete Engineering	◎Advanced Course in Ground Disaster Prevention Ⅱ ○Computational Mechanics Ⅲ ○Decision Theory under Uncertainty	○Advanced Science and Technology Ⅰ, Ⅱ ○Master's Thesis	○Master's Thesis	◎Vibration Theory of Spatial Structures ◎Geo-Hydraulics ○Limnological Environment ◎Ground Disaster Prevention ○Advanced Science and Technology Ⅰ, Ⅱ	◎Adaptive Structural Control ◎Management of Coastal Environments ○Theory of Transportation System Planning ○Space-Time Analysis of Travel Behaviour ○Structural Diagnostics
	To acquire advanced and superior expertise	○Computational Mechanics Ⅰ, Ⅱ	◎Earthquake Engineering ○Computational Mechanics Ⅲ ○Advanced Hydraulics ○Advanced Mechanics of Structural Concrete ○Transport System Engineering			◎Design of Soil Structures and Foundations ○Instability and Stabilization of Cut, Filled and Reclaimed Land ◎Regional Geofluid Mechanics	○Analysis of Hydrospheric Environments ○Geomechanics for Underground Structures ◎Theory of Transportation System Planning
	To acquire in-depth knowledge to work as researchers in their respective fields of specialty	○Advanced Science and Technology Ⅰ, Ⅱ ○Advanced Mechanics of Fluid Flows	○Advanced Soil Mechanics Ⅱ ○Advanced Mechanics of Structural Concrete	○Advanced Science and Technology Ⅰ, Ⅱ		○Instability and Stabilization of Cut, Filled and Reclaimed Land ○Advanced Science and Technology Ⅰ, Ⅱ ◎Urban Spatial Analysis ◎Advanced Theory of Socio-Economic Systems ○Regional Geofluid Mechanics	○Structural Diagnostics ○Theories on Hydraulic Planning

Department name: Electrical and Electronic Engineering
School name: Graduate School of Engineering

Curriculum organization and implementation system where the students can reach the study goals set in the Degree Awarding Policy of the Graduate School of Engineering by taking the provided courses

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Enriched Humanity	To acquire high ethical standards	○Research Work in Electrical and Electronics Engineering ○Advanced Science and Technology I-1～5				○Advanced Science and Technology II-1～5	
	To acquire a solid understanding of the impact of science and technology on society	○Research Work in Electrical and Electronics Engineering ○Advanced Science and Technology I-1～5				○Advanced Science and Technology II-1～5	
	To acquire the ability to take appropriate actions	○Special Lecture I ○Special Lecture II			○Research Work in Electrical and Electronics Engineering		
Creativity	to maintain the liberal and open-minded culture	○Seminar on Advanced Electrical and Electronics Engineering	○Research Work in Electrical and Electronics Engineering	○Special Lecture III			
	To acquire the ability to solve issues in a creative manner	○Special Lecture I ○Special Lecture II	○Research Work in Electrical and Electronics Engineering	○Special Lecture III		○Research Work in Electrical and Electronics Engineering	
International Awareness	To acquire the ability to conduct exchanges with overseas partners			○Research Work in Electrical and Electronics Engineering		○Research Work in Electrical and Electronics Engineering	
	To acquire a deep understanding of other cultures			○Research Work in Electrical and Electronics Engineering			
	Ability to exhibit individuality				○Research Work in Electrical and Electronics Engineering		○Research Work in Electrical and Electronics Engineering

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
	To acquire Highly specialized knowledge	◎Diffraction Physics of X-rays and Electrons ◎Advanced Course on Quantum Mechanics ◎Advanced Course on Electromagnetic Wave Theory ◎Quantum Optics and Optical Properties of Solids ◎Devices for Optical Communications ◎Advanced Solid State Physics I ◎Advanced Solid State Physics II ◎Advanced Electic Power Engineering ◎Advanced Course on Integrated Circuit Design ◎Advanced Course on Computer System ◎Advanced Course on Communication Systems ◎Digital Image Processing ◎Advanced System Engineering ◎Advanced Applied Math I～IV	◎Magnetism of Materials ◎Photonics Devices ◎Physical Properties of Electronic Materials ◎Mesoscopic Electronic Materials ◎Advanced Vacuum Engineering ◎Advanced Course on Lightwave Electronics ◎Advanced Gas Discharge and Plasma Engineering ◎Advanced Course on Integrated Circuit Systems ◎Advanced Course on Logic for Computer Engineering ◎Advanced Course on Information Engineering ◎Complexity Theory ◎Data Structures ◎Modern Control Systems Engineering	◎Advanced Course on Quantum Electronics ◎Advanced Course on Software Design ◎Optimization Theory	◎Advanced Course on Energy Conversion ◎Advanced Course on Information Network	◎Mesoscopic Materials ◎Structure of Surface ◎Photonic Materials I ◎Quantum Devices I ◎Nano-Structure Electronics I ◎Physical Analysis on Electric Energy ◎Kinematics of High Energy Particles and Their Acceleration ◎Integrated Circuit Architecture ◎Intelligent Agents ◎Information Theory ◎Algorightm Design ◎Learning and Inference ◎Thin Film Engineering for Oxide Devices ◎Atom-Controlled Thin Film Materials	◎Microfabrication Science and Technology ◎Electronic Properties of Condensed Matter ◎Photonic Materials II ◎Quantum Devices II ◎Nano-Structure Electronics II ◎Advanced Plasma Applications ◎Integrated Circuit Design ◎Distributed Intelligence and Multi-Agent Systems ◎Knowledge Assisted Coding ◎Advance Data Structures ◎Theory of Brain-like Learning ◎Opto-Electronic Thin Film Semiconductor Engineering
	To acquire wide-ranging insights	○Diffraction Physics of X-rays and Electrons ○Advanced Course on Quantum Mechanics ○Advanced Course on Electromagnetic Wave Theory ○Quantum Optics and Optical Properties of Solids ○Devices for Optical Communications ○Advanced Solid State Physics I ○Advanced Solid State Physics II ○Advanced Electic Power Engineering ○Advanced Course on Integrated Circuit Design ○Advanced Course on Computer System ○Advanced Course on Communication Systems ○Digital Image Processing ○Advanced System Engineering ○Advanced Applied Math I～IV	○Magnetism of Materials ○Photonics Devices ○Physical Properties of Electronic Materials ○Mesoscopic Electronic Materials ○Advanced Vacuum Engineering ○Advanced Course on Lightwave Electronics ○Advanced Gas Discharge and Plasma Engineering ○Advanced Course on Integrated Circuit Systems ○Advanced Course on Logic for Computer Engineering ○Advanced Course on Information Engineering ○Complexity Theory ○Data Structures ○Modern Control Systems Engineering	○Advanced Course on Quantum Electronics ○Advanced Course on Software Design ○Optimization Theory	○Advanced Course on Energy Conversion ○Advanced Course on Information Network	○Mesoscopic Materials ○Structure of Surface ○Photonic Materials I ○Quantum Devices I ○Nano-Structure Electronics I ○Physical Analysis on Electric Energy ○Kinematics of High Energy Particles and Their Acceleration ○Integrated Circuit Architecture ○Intelligent Agents ○Information Theory ○Algorightm Design ○Learning and Inference ○Thin Film Engineering for Oxide Devices ○Atom-Controlled Thin Film Materials	○Microfabrication Science and Technology ○Electronic Properties of Condensed Matter ○Photonic Materials II ○Quantum Devices II ○Nano-Structure Electronics II ○Advanced Plasma Applications ○Integrated Circuit Design ○Distributed Intelligence and Multi-Agent Systems ○Knowledge Assisted Coding ○Advance Data Structures ○Theory of Brain-like Learning ○Opto-Electronic Thin Film Semiconductor Engineering

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Expertise	To acquire basic academic abilities to resolve issues from a broad perspective	◎Seminar on Advanced Electrical and Electronics Engineering ◎Advanced Science and Technology I-1～5 ◎Advanced Applied Math I～IV				◎Advanced Science and Technology II-1～5	
	To acquire practical skills and creativity to resolve issues from a broad perspective	○Seminar on Advanced Electrical and Electronics Engineering ◎Special Lecture I ◎Special Lecture II		◎Special Lecture III			○Research Work in Electrical and Electronics Engineering
	To acquire advanced and superior expertise	○Diffraction Physics of X-rays and Electrons ○Advanced Course on Quantum Mechanics ○Advanced Course on Electromagnetic Wave Theory ○Quantum Optics and Optical Properties of Solids ○Devices for Optical Communications ○Advanced Solid State Physics I ○Advanced Solid State Physics II ○Advanced Electic Power Engineering ○Advanced Course on Integrated Circuit Design ○Advanced Course on Computer System ○Advanced Course on Communication Systems ○Digital Image Processing ○Advanced System Engineering ○Advanced Applied Math I～IV	○Magnetism of Materials ○Photonics Devices ○Physical Properties of Electronic Materials ○Mesoscopic Electronic Materials ○Advanced Vacuum Engineering ○Advanced Course on Lightwave Electronics ○Advanced Gas Discharge and Plasma Engineering ○Advanced Course on Integrated Circuit Systems ○Advanced Course on Logic for Computer Engineering ○Advanced Course on Information Engineering ○Complexity Theory ○Data Structures ○Modern Control Systems Engineering	○Advanced Course on Quantum Electronics ○Advanced Course on Software Design ○Optimization Theory	○Advanced Course on Energy Conversion ○Advanced Course on Information Network	○Mesoscopic Materials ○Structure of Surface ○Photonic Materials I ○Quantum Devices I ○Nano-Structure Electronics I ○Physical Analysis on Electric Energy ○Kinematics of High Energy Particles and Their Acceleration ○Integrated Circuit Architecture ○Intelligent Agents ○Information Theory ○Algorightm Design ○Learning and Inference ○Thin Film Engineering for Oxide Devices ○Atom-Controlled Thin Film Materials	○Microfabrication Science and Technology ○Electronic Properties of Condensed Matter ○Photonic Materials II ○Quantum Devices II ○Nano-Structure Electronics II ○Advanced Plasma Applications ○Integrated Circuit Design ○Distributed Intelligence and Multi-Agent Systems ○Knowledge Assisted Coding ○Advance Data Structures ○Theory of Brain-like Learning ○Opto-Electronic Thin Film Semiconductor Engineering
	To acquire in-depth knowledge to work as researchers in their respective fields of specialty	◎Research Work in Electrical and Electronics Engineering ○Advanced Applied Math I～IV	◎Research Work in Electrical and Electronics Engineering	◎Research Work in Electrical and Electronics Engineering	◎Research Work in Electrical and Electronics Engineering	◎Research Work in Electrical and Electronics Engineering	◎Research Work in Electrical and Electronics Engineering

Department name: Mechanical Engineering
School name: Graduate School of Engineering

Curriculum organization and implementation system where the students can reach the study goals set in the Degree Awarding Policy of the Graduate School of Engineering by taking the provided courses

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Enriched Humanity	To acqure high ethical standards	○ Professional Practice ◎Biomedical Ethics and Safety※	○ Professional Practice				
	To aqcuir a solid understanding of the impact of science and technology on society	○ Professional Practice ○Social Medicine※ ○Biomedical Ethics and Safety※	○ Professional Practice ○Specialized lectures, healthcare and welfare I※				
	To acquire the ability to take appropriate actions	◎ Professional Practice ◎Social Medicine※ ○Biomedical Ethics and Safety※	◎ Advanced Lecture II ◎ Professional Practice ◎Specialized lectures, healthcare and welfare I※				
Creativity	To maintain a liberal and open-minded culture	○Advanced Mechanical Engineering Seminar I	○Advanced Mechanical Engineering Seminar II	○Advanced Mechanical Engineering Seminar III	○Advanced Mechanical Engineering Seminar IV		
	Ability to solve issues in a creative manner	○Advanced Mechanical Engineering Seminar I ○ Master Course Research I	○Advanced Mechanical Engineering Seminar II ○ Master Course Research I	○Advanced Mechanical Engineering Seminar III ○ Master Course Research II	○Advanced Mechanical Engineering Seminar IV ○ Master Course Research II		
International Awareness	To aquire the ability to conduct exchanges with overseas partners	◎ Advanced Lecture I ◎English Special Lecture I	○ Advanced Lecture II ◎English Special Lecture II	◎English Special Lecture III	◎English Special Lecture IV		
	To acquire a deep understanding of other cultures	○ Advanced Lecture I ○English Special Lecture I	○English Special Lecture II	○English Special Lecture III	○English Special Lecture IV		
	To acquire the ability to exhibit individuality	○ Advanced Lecture I ○English Special Lecture I	○ Advanced Lecture II ○English Special Lecture II	○English Special Lecture III	○English Special Lecture IV		

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
	To acquire highly specialized knowledge	◎Advanced Vacuum Engineering ◎Diffraction Physics of X-rays and Electrons ◎Aerodynamics ◎Transport Phenomena ◎Space Mechanical Engineering ◎Combustion Engineering ◎Complex Fluid Dynamics ◎Applied Solid Mechanics ◎ Computational Materials Science ◎ Fracture Mechanics ◎ Quantum Materials Engineering ◎ Applied Surface Engineering ◎ Micromachine ◎Multi-Variable Control Theory ◎ Applied Mechanics for Machine ◎Intelligent Manufacturing Systems ◎ Micro System Design ◎Intelligent Artificial Systems ○Advanced Science and TechnologyⅠ-1 ○Advanced Science and TechnologyⅠ-2 ○Advanced Science and TechnologyⅠ-3 ○Advanced Science and TechnologyⅠ-4 ○Advanced Science and TechnologyⅠ-5 ◎ Advanced Applied Math.Ⅰ ◎ Advanced Applied Math.Ⅱ ◎ Advanced Applied Math.Ⅲ ◎ Advanced Applied Math.Ⅳ ○Topics in Public Health Ⅰ※ ○Biomedical Science A※ ○Biomedical Science B※ ○Planning and Regeneration Policy for Residential Environment※ ○Advanced Urban Environmental Planning※ ○Advanced Course on Software Design※ ○Digital Image Processing※ ○Structure and Properties of Polymers※ ○Advanced Functional Materials※ ○Bioreaction Engineering※	◎ Nonlinear Dynamics in Fluids ◎Gas Dynamics ◎Thermal Energy System Engineering ◎Applied Thermal Engineering ◎Instrumentation for Thermo-Fluid Dynamics ◎Multi-scale solid mechanics ◎Mechanics of Composite Materials ◎ Reliability Engineering ◎Crystal Physics in Materials Science ◎ Advanced Control Systems Theory ◎ Analysis of Dynamic Systems ◎Bioengineering ◎Advanced Manufacturing Process ◎Theory and Methodology on Knowledge for Product Design and Development ○ Biomechanics※ ○Safety Planning for Urban Architectural Environment※ ○Advanced Lecture Ⅲ※ ○Process System Engineering※	○Advanced Course on Computer System※		○Fluid Energy Morphology ○Multiphase Thermal Energy Transport ○Thermal Engineering in Environmental Problems ○Analysis of Complex Thermal-Hydraulic Phenomena ○Hierarchical Structures of Engineering Materials ○Environmentally Assisted and High Temperature Strength of Materials ○Nano Structural and Functional Materials Science ○Electronic Control in Nanostructured Materials ○Nano- and Microengineering ○Intelligent Control of Mechanical Systems ○Emergent Theory of Dynamic Functions ○Analysis of Biological Dynamics ○Future Manufacturing Systems ○Advanced Manufacturing Processes ○Adaptive Intelligent Systems ○Database Systems for Intelligent Design ○Information Technology for Industrial Applications ○Information and Control Theory ○Perception Mechanism ○Methodology for Practical Development of Technology ○Methodology for Practical Solution of Problem ○Advanced Science and TechnologyⅡ-1 ○Advanced Science and TechnologyⅡ-2 ○Advanced Science and TechnologyⅡ-3 ○Advanced Science and TechnologyⅡ-4 ○Advanced Science and TechnologyⅡ-5	○Fluid Flow Phenomena with High-Velocity and Phase Change ○Thermal Energy System ○Energy Conversion Theory ○Complex Flow Diagnostics ○Functions and Forms of Engineering Materials ○Interface Mechanics ○Synthesis of Functional Surfaces ○Physical Analysis of Nanometric Structures ○Strength and Fracture of Nano and Micro Materials ○Emergent Theory of Dynamic Systems ○ Creation and Optimization of Mechanism ○Nano/Micro System Engineering ○Design Theory and Methodology of Artifactual Environments ○Intelligent Control in Production Systems ○Welfare Information Technology ○Information Transmission Devices
	To acquire wide-ranging insights	○Advanced Vacuum Engineering ○Diffraction Physics of X-rays and Electrons ○Aerodynamics ○Transport Phenomena ○Space Mechanical Engineering ○Combustion Engineering ○Complex Fluid Dynamics ○Applied Solid Mechanics ○ Computational Materials Science ○ Fracture Mechanics ○ Quantum Materials Engineering ○ Applied Surface Engineering ○ Micromachine ○Multi-Variable Control Theory ○ Applied Mechanics for Machine ○Intelligent Manufacturing Systems ○ Micro System Design ○Intelligent Artificial Systems ◎ Topics in Public Health Ⅰ※ ◎Biomedical Science A※ ◎Biomedical Science B※ ○Social Medicine※ ◎Planning and Regeneration Policy for Residential Environment※ ◎Advanced Urban Environmental Planning※ ◎Advanced Course on Software Design※ ◎Digital Image Processing※ ◎Structure and Properties of Polymers※ ◎Advanced Functional Materials※ ◎Bioreaction Engineering※	○Nonlinear Dynamics in Fluids ○Gas Dynamics ○Thermal Energy System Engineering ○Applied Thermal Engineering ○Instrumentation for Thermo-Fluid Dynamics ○Multi-scale solid mechanics ○Mechanics of Composite Materials ○Reliability Engineering ○Crystal Physics in Materials Science ○ Advanced Control Systems Theory ○ Analysis of Dynamic Systems ○Bioengineering ○Advanced Manufacturing Process ○Theory and Methodology on Knowledge for Product Design and Development ○Specialized lectures, healthcare and welfare Ⅰ※ ◎ Biomechanics※ ◎Safety Planning for Urban Architectural Environment※ ◎Advanced Lecture Ⅲ※ ◎Process System Engineering※	◎Advanced Course on Computer System※		○Fluid Energy Morphology ○Multiphase Thermal Energy Transport ○Thermal Engineering in Environmental Problems ○Analysis of Complex Thermal-Hydraulic Phenomena ○Hierarchical Structures of Engineering Materials ○Environmentally Assisted and High Temperature Strength of Materials ○Nano Structural and Functional Materials Science ○Electronic Control in Nanostructured Materials ○Nano- and Microengineering ○Intelligent Control of Mechanical Systems ○Emergent Theory of Dynamic Functions ○Analysis of Biological Dynamics ○Future Manufacturing Systems ○Advanced Manufacturing Processes ○Adaptive Intelligent Systems ○Database Systems for Intelligent Design ○Information Technology for Industrial Applications ○Information and Control Theory ○Perception Mechanism	○Fluid Flow Phenomena with High-Velocity and Phase Change ○Thermal Energy System ○Energy Conversion Theory ○Complex Flow Diagnostics ○Functions and Forms of Engineering Materials ○Interface Mechanics ○Synthesis of Functional Surfaces ○Physical Analysis of Nanometric Structures ○Strength and Fracture of Nano and Micro Materials ○Emergent Theory of Dynamic Systems ○ Creation and Optimization of Mechanism ○Nano/Micro System Engineering ○Design Theory and Methodology of Artifactual Environments ○Intelligent Control in Production Systems ○Welfare Information Technology ○Information Transmission Devices

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Expertise	Basic academic abilities to resolve issues from a broad perspective	○Advanced Vacuum Engineering ○Diffraction Physics of X-rays and Electrons ○Aerodynamics ○Transport Phenomena ○Space Mechanical Engineering ○Combustion Engineering ○Complex Fluid Dynamics ○Applied Solid Mechanics ○ Computational Materials Science ○ Fracture Mechanics ○ Quantum Materials Engineering ○ Applied Surface Engineering ○ Micromachine ○Multi-Variable Control Theory ○ Applied Mechanics for Machine ○Intelligent Manufacturing Systems ○ Micro System Design ○Intelligent Manufacturing Systems ◎Advanced Mechanical Engineering Seminar I ◎ Master Course Research I ○ Topics in Public Health I※ ○Biomedical Science A※ ○Biomedical Science B※ ○Planning and Regeneration Policy for Residential Environment※ ○Advanced Urban Environmental Planning※ ○Advanced Course on Software Design※ ○Digital Image Processing※ ○Structure and Properties of Polymers※ ○Advanced Functional Materials※ ○Bioreaction Engineering※	○Nonlinear Dynamics in Fluids ○Gas Dynamics ○Thermal Energy System Engineering ○Applied Thermal Engineering ○Instrumentation for Thermo-Fluid Dynamics ○Multi-scale solid mechanics ○Mechanics of Composite Materials ○Reliability Engineering ○Crystal Physics in Materials Science ○ Advanced Control Systems Theory ○ Analysis of Dynamic Systems ○Bioengineering ○Advanced Manufacturing Process ○Theory and Methodology on Knowledge for Product Design and Development ◎Advanced Mechanical Engineering Seminar II ◎ Master Course Research I ○ Biomechanics※ ○Safety Planning for Urban Architectural Environment※ ○Advanced Lecture III※ ○Process System Engineering※	◎Advanced Mechanical Engineering Seminar III ○ Master Course Research II ○Advanced Course on Computer System※	◎Advanced Mechanical Engineering Seminar IV ○ Master Course Research II		
	To acquire practical skills and creativity to resolve issues from a broad perspective	○ Master Course Research I	○ Master Course Research I	◎ Master Course Research II	◎ Master Course Research II	○Doctor Course Research	○Doctor Course Research

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
	To acquire advanced and superior expertise					◎Fluid Energy Morphology ◎Multiphase Thermal Energy Transport ◎Thermal Engineering in Environmental Problems ◎Analysis of Complex Thermal-Hydraulic Phenomena ◎Hierarchical Structures of Engineering Materials ◎Environmentally Assisted and High Temperature Strength of Materials ◎Nano Structural and Functional Materials Science ◎Electronic Control in Nanostructured Materials ◎Nano- and Microengineering ◎Intelligent Control of Mechanical Systems ◎Emergent Theory of Dynamic Functions ◎Analysis of Biological Dynamics ◎Future Manufacturing Systems ◎Advanced Manufacturing Processes ◎Adaptive Intelligent Systems ◎Database Systems for Intelligent Design ◎Information Technology for Industrial Applications ◎Information and Control Theory ◎Perception Mechanism ○Doctor Course Research	◎Fluid Flow Phenomena with High-Velocity and Phase Change ◎Thermal Energy System ◎Energy Conversion Theory ◎Complex Flow Diagnostics ◎Functions and Forms of Engineering Materials ◎Interface Mechanics ◎Synthesis of Functional Surfaces ◎Physical Analysis of Nanometric Structures ◎Strength and Fracture of Nano and Micro Materials ◎Emergent Theory of Dynamic Systems ◎ Creation and Optimization of Mechanism ◎Nano/Micro System Engineering ◎Design Theory and Methodology of Artifactual Environments ◎Intelligent Control in Production Systems ◎Welfare Information Technology ◎Information Transmission Devices ○Doctor Course Research
	To acquire in-depth knowledge to work as researchers in their respective fields of specialty					◎Doctor Course Research	◎Doctor Course Research

Department name: Chemical Science and Engineering
School name: Graduate School of Engineering

Curriculum organization and implementation system where the students can reach the study goals set in the Degree Awarding Policy of the Graduate School of Engineering by taking the provided courses

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
Enriched Humanity	To acquire high ethical standards	○ Advanced Science and TechnologyⅠ-1 ○ Advanced Science and TechnologyⅠ-2 ○ Advanced Science and TechnologyⅠ-3 ○ Advanced Science and TechnologyⅠ-4 ○ Advanced Science and TechnologyⅠ-5 ◎ Master Course Research				○ Advanced Science and TechnologyⅡ-1 ○ Advanced Science and TechnologyⅡ-2 ○ Advanced Science and TechnologyⅡ-3 ○ Advanced Science and TechnologyⅡ-4 ○ Advanced Science and TechnologyⅡ-5	
	To acquire a solid understanding of the impact of science and technology on society	○ Advanced Science and TechnologyⅠ-1 ○ Advanced Science and TechnologyⅠ-2 ○ Advanced Science and TechnologyⅠ-3 ○ Advanced Science and TechnologyⅠ-4 ○ Advanced Science and TechnologyⅠ-5	◎ Master Course Research				
	To acquire the ability to take appropriate actions	○ Advanced Lecture Ⅰ ○ Advanced Lecture Ⅱ ○ Advanced Lecture Ⅲ ○ Advanced Lecture Ⅳ		◎ Master Course Research			
Creativity	To maintain the liberal and open-minded culture	○ Literature Research Ⅰ ○ Master Course Research	○ Literature Research Ⅰ	○ Literature Research Ⅰ	○ Literature Research Ⅰ	◎ Doctor Course Research	
	To acquire the ability to solve issues in a creative manner	○ Literature Research Ⅱ ○ Advanced Lecture Ⅰ ○ Advanced Lecture Ⅱ ○ Advanced Lecture Ⅲ ○ Advanced Lecture Ⅳ	○ Literature Research Ⅱ ○ Master Course Research	○ Literature Research Ⅱ	○ Literature Research Ⅱ ○ Master Course Research		◎ Doctor Course Research
International Awareness	To acquire the ability to conduct exchanges with overseas partners	○ Literature Research Ⅱ ◎ English for Science & Engineering	○ Literature Research Ⅱ ○ English for Science & Engineering	○ Literature Research Ⅱ	○ Literature Research Ⅱ	○ Doctor Course Research	
	To acquire a deep understanding of other cultures	○ English for Science & Engineering ○ Literature Research Ⅰ	○ Literature Research Ⅰ ◎ English for Science & Engineering	○ Literature Research Ⅰ	○ Literature Research Ⅰ		
	Ability to exhibit individuality	○ English for Science & Engineering	○ English for Science & Engineering				○ Doctor Course Research

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
	To acquire highly specialized knowledge	◎ Advanced Quantum Chemistry(sub ：Computational Material Science) ◎ Structure of Inorganic Materials ◎ Physical Properties of Inorganic Materials ◎ Inorganic Reaction Mechanisms ◎ Synthetic Organic Chemistry ◎ Organic Reaction Mechanism ◎ Structure and Properties of Polymers ◎ Advanced Polymer Chemistry ◎ Advanced Functional Materials ◎ Advanced Reaction Engineering ◎ Advance Transport Phenomena ◎ Bioreaction Engineering ◎ Molecular Biotechnology	◎ Applied Physical Chemistry ◎ Applied Synthetic Organic Chemistry ◎Chemistry of Functional Polymers ◎Advanced Functional Molecular chemistry ◎ Advanced Physical Chemistry ◎ Physical Properties of Fluids ◎ Design Engineering of Catalytic Processes ◎ Advanced Topics in Catalysis ◎ Transport Phenomena in Dispersed-phase System ◎ Unit Operation ◎ Process System Engineering ◎ Biochemical Reaction Engineering ◎ Advanced Biochemical Engineering ◎ Bioseparation Engineering			○ Advanced Science and TechnologyII-1 ○ Advanced Science and TechnologyII-2 ○ Advanced Science and TechnologyII-3 ○ Advanced Science and TechnologyII-4 ○ Advanced Science and TechnologyII-5	
	To acquire wide-ranging insights	◎ Advanced Science and TechnologyI-1 ◎ Advanced Science and TechnologyI-2 ◎ Advanced Science and TechnologyI-3 ◎ Advanced Science and TechnologyI-4 ◎ Advanced Science and TechnologyI-5 ○ Advanced Applied Math.I ○ Advanced Applied Math.II ○ Advanced Applied Math.III ○ Advanced Applied Math.IV ◎ Advanced Lecture Ⅰ ◎ Advanced Lecture Ⅱ ◎ Advanced Lecture Ⅲ ◎ Advanced Lecture Ⅳ				◎ Advanced Science and TechnologyII-1 ◎ Advanced Science and TechnologyII-2 ◎ Advanced Science and TechnologyII-3 ◎ Advanced Science and TechnologyII-4 ◎ Advanced Science and TechnologyII-5 ○ Thin Film Formation of Organic Molecules ○ Materials Chemistry of Multi-phase Systems ○ Organic Reaction Mechanisms ○ Functional Polymers ○ Advanced Synthetic Chemistry of Inorganic Polymers ○ Environmental Molecular Chemistry ○ Physical Properties of Functional Colloid Systems ○ Design of Bio-functional Materials ○ Catalysis and Physico-Chemical Properties of Practical Heterogeneous Catalysts ○ Physical Property Analysis ○ Control of Transport Phenomena ○ Control of Bioreactions ○ Biofunctional Engineering ○ Process Design Engineering ○ Glass Materials for Photonics ○ Materials for Energy Systems ○ Post-genome Applied biology ○ Plant Molecular Biology ○ Structual Molecular Biology ○ Pharmaceutical Research &	○ Structural Chemistry in Molecular Thin Films ○ Functions of Multi-phase Systems ○ Synthesis of Organic Molecules ○ Reactions for Organic Materials ○ Selected Topics in Functional Polymer Particles ○ Reaction-Site Design ○ Design of Catalysis and Control of Catalytic Reaction ○ Analysis of Nonlinear Phenomena ○ Diffusional Unit Operations ○ Materials Function ○ Physico-chemical Properties of Fluids ○ Bioreaction Process Engineering ○ Control of Molecular Interactions ○ Process System Analysis ○ Structure-Function Relationship of Biomolecules ○ Chemistry of Molecular Structures and Reactions ○ Energy Development ○ Solid State Electrochemistry ○ Doctor Course Research

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
						○ Pharmaceutical Research & Technology ○ Process Engineering on Parenteral Dosage Forms ○ Process Engineering on Oral Dosage Forms ○ Chemical Sensing ○ Bioelectronics ○ Doctor Course Research	
Expertise	To acquire basic academic abilities to resolve issues from a broad perspective	◎ Advanced Applied Math.I ◎ Advanced Applied Math.II ◎ Advanced Applied Math.III ◎ Advanced Applied Math.IV ○ Advanced Quantum Chemistry(sub ：Computational Material Science) ○ Structure of Inorganic Materials ○ Physical Properties of Inorganic Materials ○ Inorganic Reaction Mechanisms ○ Synthetic Organic Chemistry ○ Organic Reaction Mechanism ○ Structure and Properties of Polymers ○ Advanced Polymer Chemistry ○ Advanced Functional Materials ○ Advanced Reaction Engineering ○ Advance Transport Phenomena ○ Bioreaction Engineering ○ Molecular Biotechnology ◎Literature Research I	◎ Literature Research I	◎ Literature Research I	◎ Literature Research I		

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
	To acquire practical skills and creativity to resolve issues from a broad perspective	○ Advanced Quantum Chemistry(sub ：Computational Material Science) ○ Structure of Inorganic Materials ○ Physical Properties of Inorganic Materials ○ Inorganic Reaction Mechanisms ○ Synthetic Organic Chemistry ○ Organic Reaction Mechanism ○ Structure and Properties of Polymers ○ Advanced Polymer Chemistry ○ Advanced Functional Materials ○ Advanced Reaction Engineering ○ Advance Transport Phenomena ○ Bioreaction Engineering ○ Molecular Biotechnology ◎ Literature Research I ○ Master Course Research	○ Applied Physical Chemistry ○ Applied Synthetic Organic Chemistry ○Chemistry of Functional Polymers ○ Advanced Functional Molecular chemistry ○ Advanced Physical Chemistry ○ Physical Properties of Fluids ○ Design Engineering of Catalytic Processes ○ Advanced Topics in Catalysis ○ Transport Phenomena in Dispersed-phase System ○ Unit Operation ○ Process System Engineering ○ Biochemical Reaction Engineering ○ Advanced Biochemical Engineering ○ Bioseparation Engineering ◎ Literature Research II	◎ Literature Research II	◎ Literature Research II		
	To acquire advanced and superior expertise		○ Applied Physical Chemistry ○ Applied Synthetic Organic Chemistry ○Chemistry of Functional Polymers ○ Advanced Functional Molecular chemistry ○ Advanced Physical Chemistry ○ Physical Properties of Fluids ○ Design Engineering of Catalytic Processes ○ Advanced Topics in Catalysis ○ Transport Phenomena in Dispersed-phase System ○ Unit Operation ○ Process System Engineering ○ Biochemical Reaction Engineering ○ Advanced Biochemical Engineering ○ Bioseparation Engineering ○ Master Course Research	○ Master Course Research	○ Master Course Research	○ Thin Film Formation of Organic Molecules ○ Materials Chemistry of Multi-phase Systems ○ Organic Reaction Mechanisms ○ Functional Polymers ○ Advanced Synthetic Chemistry of Inorganic Polymers ○ Environmental Molecular Chemistry ○ Physical Properties of Functional Colloid Systems ○ Design of Bio-functional Materials ○ Catalysis and Physico-Chemical Properties of Practical Heterogeneous Catalysts ○ Physical Property Analysis ○ Control of Transport Phenomena ○ Control of Bioreactions ○ Biofunctional Engineering ○ Process Design Engineering ○ Glass Materials for Photonics ○ Materials for Energy Systems ○ Post-genome Applied biology ○ Plant Molecular Biology ○ Structual Molecular Biology ○ Pharmaceutical Research & Technology ○ Process Engineering on Parenteral Dosage Forms ○ Process Engineering on Oral Dosage Forms ○ Chemical Sensing ○ Bioelectronics ○ Doctor Course Research	○ Structural Chemistry in Molecular Thin Films ○ Functions of Multi-phase Systems ○ Synthesis of Organic Molecules ○ Reactions for Organic Materials ○ Selected Topics in Functional Polymer Particles ○ Reaction-Site Design ○ Design of Catalysis and Control of Catalytic Reaction ○ Analysis of Nonlinear Phenomena ○ Diffusional Unit Operations ○ Materials Function ○ Physico-chemical Properties of Fluids ○ Bioreaction Process Engineering ○ Control of Molecular Interactions ○ Process System Analysis ○ Structure-Function Relationship of Biomolecules ○ Chemistry of Molecular Structures and Reactions ○ Energy Development ○ Solid State Electrochemistry ○ Doctor Course Research

Degree Awarding Policy of the Graduate School of Engineering	Study goals	1st year		2nd year		Doctoral Program	
		1st semester	2nd semester	1st semester	2nd semester	1st semester	2nd semester
	To acquire in-depth knowledge to work as researchers in their respective fields of specialty			○ Master Course Research	◎ Master Course Research	○ Thin Film Formation of Organic Molecules ○ Materials Chemistry of Multi-phase Systems ○ Organic Reaction Mechanisms ○ Functional Polymers ○ Advanced Synthetic Chemistry of Inorganic Polymers ○ Physical Properties of Functional Colloid Systems ○ Design of Bio-functional Materials ○ Catalysis and Physico-Chemical Properties of Practical Heterogeneous Catalysts ○ Physical Property Analysis ○ Control of Transport Phenomena ○ Control of Bioreactions ○ Biofunctional Engineering ○ Process Design Engineering ○ Glass Materials for Photonics ○ Materials for Energy Systems ○ Post-genome Applied biology ○ Plant Molecular Biology ○ Structual Molecular Biology ○ Pharmaceutical Research & Technology ○ Process Engineering on Parenteral Dosage Forms ○ Process Engineering on Oral Dosage Forms ○ Chemical Sensing ○ Bioelectronics ○ Doctor Course Research	○ Doctor Course Research