KINGS KEPCO INTERNATIONAL NUCLEAR GRADUATE SCHOOL

658-91 Haemaji-ro, Seosaeng-myeon, Ulju-gun
Ulsan 45014 Korea
Tel. +82-52-712-7121 admission@kings.ac.kr

August 5, 2026

Subject: 2027 KINGS Master's Degree Scholarship Program

Dear Sir/Madam,

I am pleased to inform you of the 2027 Admission Guidelines for the KINGS Master's Degree Scholarship Program.

KINGS offers a two-year Master's program in Nuclear Power Plant Engineering (NPP) and Energy Policy and Engineering (EPE). The program consists of practical curriculum and is recommended for professionals working in the nuclear and energy-related sectors.

As part of our continuous contribution to sharing knowledge and technology to grow global human resources and leadership, KINGS offers full scholarship for admitted students.

Applicants can access the online application system via our website at www.kings.ac.kr, which will be open from September 15 to October 26, 2026. Please refer to the attached file for further details on the 2027 Admission Guidelines.

We look forward to welcoming qualified applicants from your respectful organization for the Spring semester of 2027. Your cooperation in promoting this program and its recommendation will be greatly appreciated.

If you have any questions or require more information, please contact the Admissions & Student Affairs Team at +82-712-7121 or admission@kings.ac.kr. Thank you.

Sincerely,

Hak-kyu Lim, Ph.D.
Acting President of KINGS and Dean of Academic Affairs
KEPCO International Nuclear Graduate School (KINGS)

KINGS

2027 ADMISSION GUIDELINES

KINGS KEPCO INTERNATIONAL NUCLEAR GRADUATE SCHOOL

2027

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ADMISSION GUIDELINES

ADMISSION POLICY

- KINGS desires future-oriented and experienced applicants who are working in energy related fields.
- Motivated and open-minded individuals are invited to apply.
- An ability to study in cross cultural environments is an essential asset for KINGS admission.
- KINGS is an accredited institution by the Ministry of Education of Korea.

ADMISSION CRITERIA

Eligibility criteria such as academic background, work experience, letter of recommendation, and language requirement is described in table below.

Requirement	Details
Academic Background	Bachelor's Degree or Higher
Work Experience	+1 Year Preferred
Letter of Recommendations	Company, Government or Academic Supervisor
Language Requirement	Certified English Test Score or Equivalent Language Proficiency for applicant from non-English speaking countries

TIMELINES

1 >>> Online Application	2 >>> Documents Review	3 >>> Online Personal Inventory test	4 >>> Interview	5 >>> Announcement of Final Decision
From Sep. 14 to Oct. 31	In Nov.	In Nov.	In Dec.	~ Dec. 31

*Timeline is subject to change.

HOW TO APPLY

- To access the on-line application, find the "**Apply Now**" banner on the KINGS website(www.kings.ac.kr), under the "**Admission**" menu.
- Create your own account and fill in all the required information for each page of them.
  The on-line application page will be available only during the official application period.
- Please refer to the notice on KINGS website for the 2027 application period.

REQUIRED DOCUMENTS [1)]

1	**Application for admission**	Form 1
2	**Statement of purpose**	Form 2
3	**Study & career plan**	Form 3
4	**Certificate of employment**	Form 4
5	**Two letters of Recommendation**	Form 5
6	**Original diploma and transcripts of undergraduate degree** [2)]	
7	**Proof of proficiency in English**	
8	**Verification and Consent to the integrity of the documents**	On-line system

[1)] All forms(1~5, 8) are provided at the application system
Identification photo taken within 3 months **(black and white, snapshot photo will not be accepted).**

[2)] For academic credentials, an overseas degree should be approved either by apostille or consular confirmation by local Korean Embassy. However, it may be replaced as a PDF document of the original **as you consent to verify yourself** at the application system.

PROOF OF ENGLISH PROFICIENCY

- An applicant whose native language is not English **MUST** demonstrate his/her English language proficiency by submitting any certificates from authorized institutions.

※ **Please submit one of the following documents:**

1. Official score report for an English proficiency test such as TOEFL iBT, IELTS, CEFR, New TEPS, TOEIC, or Duolingo English Test
2. An official Medium of Instruction (MOI) Letter confirming that the language of instruction was English
3. A Certificate of Graduation or Academic Transcript indicating that the medium of instruction was English

※ **Exemption from submission of English Test Report**

1. Applicants from U.S.A, Canada, U.K, Australia, New Zealand, Ireland(Native English Speaker).
2. Applicants from a country that uses English as a official language.
3. Applicants who have completed their entire university courses in English(It is required to submit certificates verifying that courses are fully taught in English.

IMPORTANT NOTICE

- For the applicants who pass the documents review are required to take **Personal Inventory Test** through on-line. Internet access link will be sent individually.
- All application documents must be typed(not hand-written) in English.
- Non-English documents are not accepted, but it is possible when attaching a notarized English translation.
- **All** submitted documents will **NOT** be returned.
- If an applicant has gained admission in an illegal manner(through forgery, alteration of documents, of document translation errors) then the **admission will be nullified.** Furthermore, if a criminal case is suspected, the candidate/student will be reported to the authorities of the Republic of Korea and of the applicant's home country in compliance with the law.

APPLICATION FEE

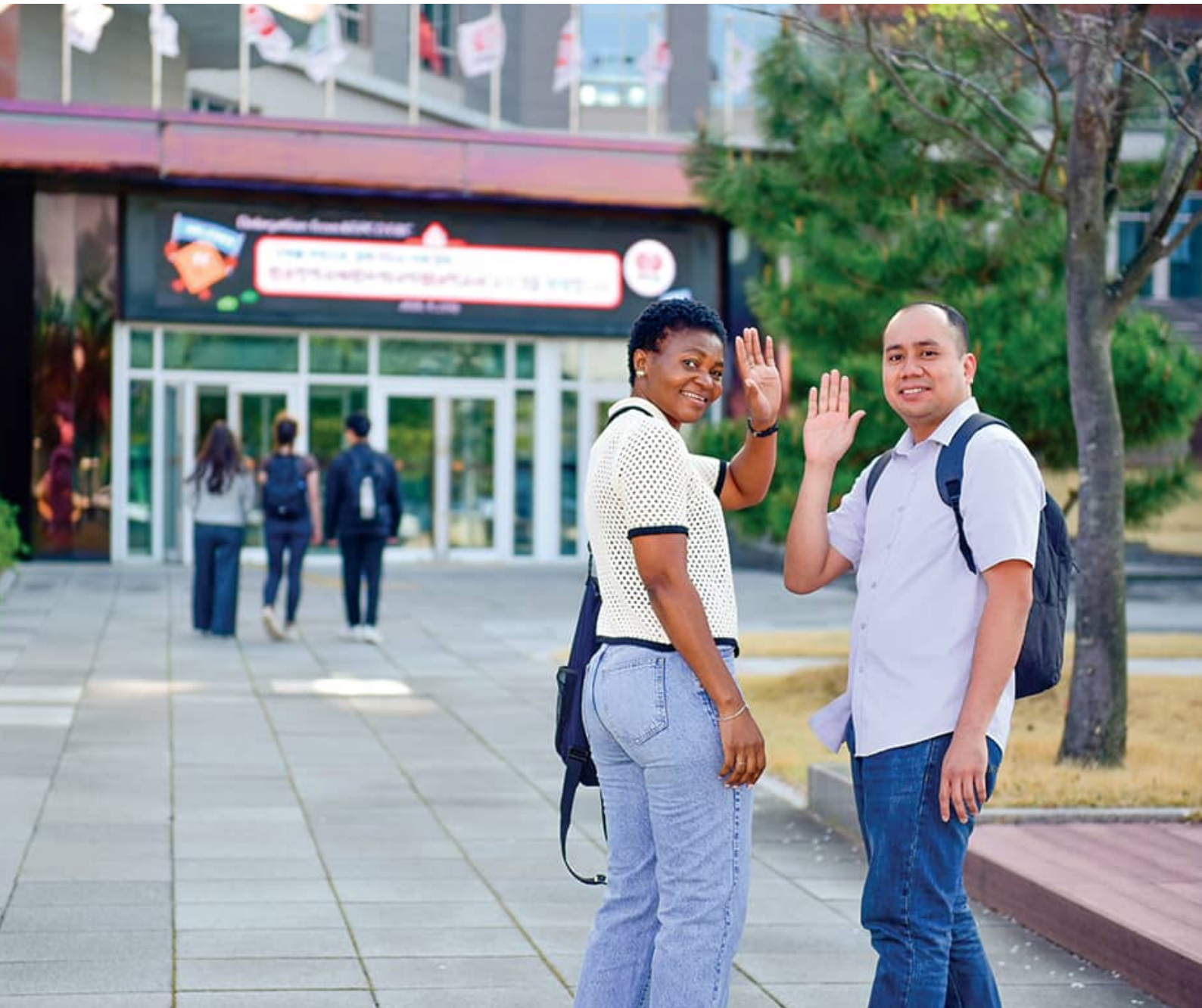
- KINGS does not charge an application fee for international students.

MAILING ADDRESS

- Room #510 main building 658-91 Haemaji-ro, Seosaeng-myeon, Ulju-gun, Ulsan 45014 Republic of Korea
  admission@kings.ac.kr

EDUCATION PROGRAM

Department of Nuclear Power Plant Engineering



Introduction

The Department of NPP (Nuclear Power Plant Engineering) offers a comprehensive graduate-level program that encompasses all aspects of a nuclear power plant project, starting from the design and certification phase, and continuing through the operation, management, and ultimately the decommissioning phase. Our program provides students with both theoretical and practical training, equipping them with the necessary skills to lead nuclear power plant projects in their respective countries.

The majority of our students are employed professionals with prior work experience in nuclear power-related corporations or companies, either in the Republic of Korea or other countries. Upon completion of the two-year (four-semesters) program at KINGS, students are awarded a Master's Degree in Nuclear Power Plant Engineering. They have the option to pursue either a Master of Engineering (ME) or a Master of Science (MS) degree.

During their first year, students undertake various courses that cover different areas of NPP Engineering, such as design, project management, construction, safety analysis, radiation protection, decommissioning, and waste management. In their second year, students specialize in a specific study area through a team project or conducting research that integrate engineering and management aspects of an NPP project. This prepares our students for global leadership positions within the energy organizations of their respective countries.

Graduation Requirements

Degree Type

- Master of Engineering (ME) in Nuclear Power Plant Engineering
- Master of Science (MS) in Nuclear Power Plant Engineering

Common Requirements

- Minimum of 36 credits, Minimum GPA of B- (2.7/4.3)
- Study Period: 2 years (March 2027 - February 2029) at KINGS
- Thesis (MS) or Individual Project Report (ME) approved by the Examining Committee

Additional Requirements for the Master of Science (MS) Degree

- Students pursuing an MS degree must satisfy one of the following requirements:
  - **Oral Presentation :** Deliver an oral presentation at a domestic or international academic conference organized by a professional society that publishes journals indexed in the Korea Citation Index (KCI) candidate level or higher (including SSCI, SCIE, SCOPUS, and KCI).
  - **Journal Article Submission :** Submit a manuscript related to the thesis topic to a journal indexed as KCI candidate or higher (including SSCI, SCIE, SCOPUS, and KCI) and receive favorable editorial feedback (e.g., accepted, accepted with revisions, or revise and resubmit).

EDUCATION PROGRAM

Department of Energy Policy and Engineering

Introduction

Energy is the backbone of national industry and an essential resource in our daily lives. Energy policy is inherently complex, involving a delicate balance between economic efficiency, supply security, and long-term sustainability. As the importance of strategic public investment and budget planning continues to grow, effective national energy planning and management has never been more critical.

The Department of Energy Policy and Engineering at KINGS offers a graduate curriculum designed to equip students with the knowledge and skills needed to address challenges within this multifaceted energy system. Our program fosters global energy leaders capable of integrated problem-solving through a combination of academic theory, hands-on training, and peer learning with professionals from electric utilities and international public institutions.

The department offers a two-year master's program, leading to either a Master of Engineering (ME) or a Master of Science (MS) in Energy Policy and Engineering.

Graduation Requirements

Degree Type

- Master of Engineering (ME) in Energy Policy and Engineering
- Master of Science (MS) in Energy Policy and Engineering

Common Requirements

- Minimum of 36 credits, Minimum GPA of B- (2.7/4.3)
- Study Period: 2 years (March 2027 - February 2029) at KINGS
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FINANCIAL DETAILS

Tuition & Fees[1)]

TUITION	Tuition is 48.4 million KRW per academic year. Tuition covers lectures, lecture materials, access to the library, and access to other facilities relevant to academic activities.
MATRICULATION FEE	Matriculation fee is 1 million KRW.
HOUSING, FOOD	Total rate of room and board is 12.8 million KRW per year including three meals a day.

[1)] All fees and costs are based on the 2026 academic year and are subject to change for the 2027 academic year.

Financial Aid & Service

SCHOLARSHIP

The KINGS Global Scholarship may be awarded as either a full or partial scholarship and covers up to two years of full-time study, depending on the applicant's qualifications along with the school's policies.
To maintain the KINGS Global Scholarship, recipients must satisfy the requirements (minimum GPA of B-, 2.7/4.3) as outlined in the KINGS regulations.
Room and board costs are fully covered for all scholarship recipients.

The IAEA has a fellowship programme for those pursuing the KINGS Master's Degree Program in Nuclear Power Plant Engineering in accordance with its policies. Please contact the IAEA liason office in your country.

RCA provides sponsorship for the KINGS Master's Degree Program in accordance with RCA policies. Eligibility is limited to applicants from RCA member countries in the Asia-Pacific region.
For detailed information, please visit the RCA Regional Office website (http://www.rcaro.org/) or contact the RCA Regional Office directly.

※ RCA : Regional Cooperative Agreement for research, development and training related to nuclear science and technology for Asia and the Pacific.

ASSISTANTSHIP

Assistantship opportunities are available for eligible international students to provide administrative support, teaching or research assistance. The monthly assistantship stipend is determined based on the types of assistantce and the number of hours worked.

MEDICAL & INSURANCE

The Korean government requires a mandatory health insurance. Any foreigner who has stayed for more than six months must subscribe to the Public National Health Insurance since 1 March 2021. The amount of health insurance fee is approximately 80,000 KRW per month.

KINGS provides basic health check-ups and care at the health office. For international students who need medical treatment at a hospital, KINGS health office refers the hospital information to the students.

CAMPUS LIFE

FACILITIES

- KINGS dormitory has 200 single occupancy rooms, a cafeteria, and an Islamic prayer room.
- Each dormitory room is equipped with a bathroom, a study desk, a single bed, and a refrigerator.
- KINGS cafeteria provides regular Korean and Western meals.
- A fully furnished common kitchen is also available for student use.
- Residential facilities including tennis and basketball courts, a futsal field, a ping-pong room, and a gym are available.
- KINGS has a high-speed internet connection which students can access on campus, free of cost.
- A Kookmin Bank(KB) ATM is also available on campus.

MONTHLY EVENTS FOR STUDENTS

February, 2027	March	April
Orientation	Matriculation 1st Semester Open	Spring Event
May	**June**	**July**
Student council election Teacher's Day	1st Culture Trip	Summer Session
August	**September**	**October**
Summer Vacation	2nd Semester Open	Fall Event
November	**December**	**January, 2028**
Photo Shoot	Winter Vacation Commencement	Commencement

※ The schedule is subject to change.

For more information, visit the KINGS website(**www.kings.ac.kr**) or contact Admission and Student Affairs Team at **admission@kings.ac.kr**

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Delegation from KEPCO E&C

Department of Nuclear Power Plant Engineering

Course Description

Curriculum & Study Areas

Common Compulsory Courses for All Tracks*

- Nuclear Power Plant Engineering
- Advanced Power Reactor and Small Modular Reactor
- Leadership and Communication, Safety Culture and Communication, Technical Writing, Speech and Debate, Cross Cultural Program
- Thesis and Individual Project Report

NPP Design and Nuclear Safety Track

The NPP Design and Nuclear Safety Track offers a comprehensive curriculum focused on nuclear reactor design, simulation, and safety assessment. Students will explore core design methodologies, safety aspects, and neutron behavior analysis using advanced nuclear design codes. They will develop proficiency in numerical methods for reactor physics, including Monte Carlo simulations, and gain insights into probabilistic risk assessment for managing uncertainties in nuclear plant operations. Practical experience includes thermal hydraulics analysis using industry-standard codes and learning safety philosophies and methods through case studies of major nuclear accidents. This track prepares students for roles in nuclear engineering with a strong emphasis on safety, design optimization, and risk management.

Study Areas

Nuclear Fuel Design, Small Modular Reactor, Probabilistic Risk Assessment and Management, Thermal Hydraulics and Safety Analysis

Elective Courses*

- **Introduction to Nuclear Reactor Analysis**
- **Equilibrium Core Nuclear Design**
- **APR1400 Nuclear Reactor Simulation using Nuclear Design Codes**
- **Advanced Nuclear Reactor Analysis**
- **Numerical Methods for Reactor Physics**
- **Application of Neutron Transport Theory**
- **Basic Probabilistic Risk Assessment**
- **Intermediate Probabilistic Risk Assessment**
- **Nuclear Thermal Hydraulic Analysis: Theory and Analytical Models**
- **Advanced Thermal Hydraulic Analysis of PWR and SMR Systems**
- **Nuclear Reactor Design and Safety**
- **Reactor Operations and Safety Analysis**

Curriculum & Study Areas

Nuclear Fuel Cycle and Radiation Safety Engineering Track

The Nuclear Fuel Cycle and Radiation Safety Engineering Track offers a specialized curriculum covering essential aspects of nuclear decommissioning and spent fuel management. Students will study radioactive waste management, including waste classification, treatment methods, and disposal techniques, along with the decontamination and decommissioning processes of nuclear facilities. The curriculum covers the entire nuclear fuel cycle, from initial stages such as fuel handling to concluding stages involving spent fuel management options like reprocessing and long-term storage. Students will gain practical skills in radiation shielding analysis using Monte Carlo simulations, focusing on radiation protection for nuclear facilities. Additionally, the track includes training in environmental impact assessment, covering radiological risk assessment, environmental analysis, and emergency planning and response for nuclear incidents. This comprehensive program prepares students for roles in managing nuclear waste, decommissioning nuclear facilities, and ensuring environmental safety and regulatory compliance in the nuclear sector.

Study Areas

NPP Decommissioning, Spent Fuel & Waste Management, Radiation Safety & Environmental Protection

Elective Courses*

- **Radioactive Waste Management**
- **Safety, Security, and Safeguards on Nuclear Fuel Cycles**
- **Nuclear Materials**
- **Nuclear Fuel Cycle**
- **Radiation Shielding Analysis**
- **Environmental Impact Assessment**

NPP Engineering and Project Management Track (INMA-NTM Program)

The NPP Engineering and Project Management Track offers a specialized curriculum designed to equip students with comprehensive knowledge and practical skills in managing international nuclear power plant (NPP) projects. This track covers essential aspects of project development, construction management, financial analysis, environmental impact assessment, and regulatory compliance within the nuclear sector. The NPP Engineering and Project Management Track Program of the Department of NPP was granted membership within the INMA-NTM (International Nuclear Management Academy Master's Programmes in Nuclear Technology Management) program on 27 September 2023 by the IAEA. Consequently, students in this Track must complete the following nine INMA core courses and fulfill INMA elective requirements. Upon graduation, they will be awarded both a KINGS master's degree certificate and a Certification of Recognition for the INMA endorsed Programme.

Study Areas

Project Management, Civil & Earthquake Engineering

Elective Courses*

- **Contract and Claim Management**
- **NPP Project Development and Contract**
- **Advanced Topics for Nuclear Project Management**
- **Special Issues in NPP Natural Hazards Analysis**
- **NPP Site Hazard Analysis and Evaluation**
- **NPP Financial Management**

INMA Compulsory Courses*

- **Nuclear Power Plant Engineering**
- **Advanced Power Reactor and Small Modular Reactor**
- **NPP Project Deployment**
- **NPP Construction Project Management**
- **Energy Business Environment**
- **Leadership and Communication I**
- **Leadership and Communication II**
- **Safety Culture and Communication**
- **Speech and Debate**

* The Common Compulsory Courses for All Tracks, Elective Courses, and INMA Compulsory Courses are based on the 2026 academic year curriculum and are subject to change.

Common Compulsory Courses

N021 ▸ Nuclear Power Plant Engineering

This course offers a comprehensive introduction to nuclear power plant (NPP) systems engineering, covering atomic and nuclear physics, radiation-matter interactions, reactor theory, heat removal, reactor safety, radiation protection, licensing, and risk management. Students systematically study 20 topics in accordance with the IAEA's International Nuclear Management Academy (INMA) endorsed program requirements, including national energy policy, project contracts and management, financial management, safety culture, and strategic leadership. Field trips to operational NPPs and APR1400 simulators provide real-world exposure, and practical sessions emphasize plant management, configuration management, and compliance with international standards.

N022 ▸ Advanced Power Reactor and Small Modular Reactor

Students explore the design and safety of APR1400 and Small Modular Reactors (SMRs). The curriculum covers reactor coolant, auxiliary, and control systems, focusing on SMR technologies like SMART and i-SMR. The course includes hands-on PWR simulator training and field trips to nuclear-related organizations, including research centers and waste management facilities. Through a group project and RTA presentation, students gain practical expertise in advanced reactor systems and nuclear industry practices.

C003 ▸ Leadership and Communication I, C004 ▸ Leadership and Communication II

Rooted in the Leadership and Negotiation Program of the Harvard Business School and Harvard Law School Program on Negotiation, this course series trains current and future leaders of energy or nuclear/radiological organizations to become adept at internal and external communication. Learners develop a way to understand themselves and others better and become familiar with a "principled negotiation" model to prepare for, execute, and meaningfully reflect on discussion, negotiation, and conflict resolution opportunities. The course is heavily interactive, requiring regular preparation prior to class, active participation, and reflection assignments. Leadership and Communication II builds on these skills through more complex cases and individualized coaching.

C010 ▸ Safety Culture and Communication

This course is structured into three sub-programs: lectures, NPA simulator sessions, and overseas technical field visits. The lecture sub-program provides lecture-based learning on nuclear safety culture, helping participants understand the safety philosophy of protecting people and the environment from radiation, with emphasis on three pillars—physical, operational, and regulatory safety measures. The simulator sub-program models representative plant operating modes including normal operation, power maneuvering, and response to abnormal or accident conditions. The overseas sub-program enables comparative learning of safety policies, organizational cultures, and management systems in an international context.

C007 ▸ Technical Writing I, C008 ▸ Technical Writing II, C009 ▸ Advanced Technical Writing

This course series provides a weekly class consisting of a lecture on understanding the structure and organization of an academic paper in technical English, and a hands-on session in which students draft a conference paper. Students develop key skills required for academic writing such as clarity, coherence, avoiding plagiarism, and adhering to academic conventions and ethics. Students select a research topic, conduct literature searches, and submit weekly drafts according to schedule, receiving detailed feedback and revising accordingly. By the end of the semester, students will have completed and finalized one conference paper.

C011 ▸ Speech and Debate

This course is designed to enhance students' soft skills and confidence in public speaking, group discussions, oral presentation, written communication, and critical and analytical thinking through the use of debating skills to analyze social, political, and economic issues. Students actively engage in discussions and formal debates on key issues that affect businesses and the global community. After learning the basics of speech and debating fundamentals such as argumentation, refutation, case construction, and verbal and non-verbal presentation techniques, students produce a video recording of their own presentation as a term project.

C001 ▸ Cross Cultural Program I, C002 ▸ Cross Cultural Program II

This program consists of three sub-courses. Cultural Korean aims to help international students gain the basics of spoken and written Korean while focusing on the development of communicative language skills. Cross Culture aims to develop a stronger cultural understanding between Korean and international students by helping them understand cultural diversities, respect differences in culture, and boost communication skills and cultural exchanges. Culture Trip takes place at the end of each semester and aims to promote cultural and social exchange between Korean and international students.

C027, C028 ▸ Thesis and Individual Project Report

This research course guides master's degree students in developing either a thesis (MS) or an individual project report (ME) under the supervision of their advisors. Students define a topic, prepare a proposal, conduct a literature review, and apply appropriate methods to produce a scholarly work. Regular meetings, progress submissions, and feedback support iterative refinement from plan to final draft. Completion requires an advisor-approved final thesis/project report and presentation, as applicable.

Elective Courses

N102 ▸ Introduction to Nuclear Reactor Analysis

This course introduces the theories and methodologies of nuclear core design and analysis. It covers basic concepts of nuclear physics, diffusion theory, reactor kinetics, core design methods, and the reactor analysis procedure including safety aspects. The course emphasizes PWR reactor core design and corresponding reactor engineering problems. The primary objective is to understand the methodologies required to design the nuclear reactor core and to analyze neutron behavior during transients and accidents.

N101 ▸ Equilibrium Core Nuclear Design

This course aims to find optimized fuel batch enrichment and the number of fuel assemblies (FAs) for each batch satisfying utility energy requirements, using FMNG and optimization theories such as the simplex method, generalized gradient reduction method, evolutionary method, and simulated annealing method. After determining the batch-specific data, the initial core loading pattern is searched using simulated annealing and evolutionary methods. For subsequent cycles, reload core and equilibrium core loading patterns are searched in terms of economic optimization.

N104 ▸ APR1400 Nuclear Reactor Simulation using Nuclear Design Codes

This course introduces nuclear design computer codes used to analyze neutron behavior in nuclear reactor cores and fuel assemblies. The codes covered are CASMO and MASTER, including basic methodologies such as homogenization, dehomogenization, energy group condensation, and the nodal method, as well as input preparation, code execution, and sample runs. In the first project, students run CASMO/MASTER to determine optimized fuel rod diameters; in the second, they determine the optimum loading pattern for a given cycle length. This course is a prerequisite for "Equilibrium Core Nuclear Design" in the second year.

N103 ▸ Advanced Nuclear Reactor Analysis

This course introduces the theories that describe neutron behavior inside a nuclear reactor and corresponding boundary conditions. Regarding neutron behavior, neutron scattering and the slowing-down process are investigated and related to the Monte Carlo method. As commercial nuclear reactor analysis methods, NEM, MOC, and Monte Carlo are explored and programmed for a two-dimensional reactor model. The primary objective is to understand advanced nuclear reactor theories such as scattering, slowing down, resonance, the fission source method, NEM, and MOC.

N111 ▸ Numerical Methods for Reactor Physics

This course provides essential knowledge and practice in implementing numerical methods for reactor core analysis. Numerical solutions of integrations, differentiations, linear algebra, and matrix eigenvalue problems are covered. In addition to numerical methods, students learn the fundamental neutron diffusion equation and how to solve it numerically. Basic Python programming skills are also introduced and practiced. Based on these methods and skills, students implement a simple, compact one- or two-dimensional neutronics code to understand the overall process of neutronics calculations.

N122 ▸ Application of Neutron Transport Theory

Neutron transport theory is a fundamental aspect of nuclear engineering, essential for understanding the behavior of neutrons in reactor cores. Starting with the derivation of the neutron transport equation, a partial differential equation describing the neutron population's behavior, students learn the physical meaning of each term within this equation. The course covers deterministic and probabilistic solutions of the equation, bridging the gap between theoretical equations and real-world implications. Specifically, students learn the principles of the Method of Characteristics and the Monte Carlo method with simple Python programming.

N121 ▸ Basic Probabilistic Risk Assessment

Probabilistic safety (risk) assessment (PSA or PRA) and reliability analysis is a comprehensive method that integrates and analyzes all elements of the safety and reliability of a nuclear power plant. It provides a direct understanding of how uncertainty affects the behavior of the plant and the results of safety and reliability assessments. To do this correctly, a good understanding of probabilistic concepts and methods is essential.

N123 ▸ Intermediate Probabilistic Risk Assessment

The proliferation of risk-information use cases in the nuclear industry has increased the need for engineers who understand risk and reliability analysis methods. This course is required for engineers performing tasks related to PRA utilization and application, and is a starting point for PRA professionals. It covers the technical elements of PRA for risk assessment and practical exercises for performing PRA. The course also discusses how PRA was developed to address key issues in nuclear power engineering, and the differences between deterministic and probabilistic approaches.

N142 ▸ Nuclear Thermal Hydraulic Analysis: Theory and Analytical Models

Safety and performance analyses of nuclear reactors involve mathematical and numerical models for thermal hydraulics. This course provides foundational knowledge of the numerical models adopted in safety and performance analysis codes, including governing equations expressed as partial differential equations, and discretization methods such as the finite difference method (FDM) and finite volume method (FVM). Both semi-implicit and implicit schemes for solving the discretized linear equations are described, along with phase coupling schemes for two-phase fluid flow. The course specifically emphasizes practical knowledge by having students develop pilot code for given exercise problems.

N143 ▸ Advanced Thermal Hydraulic Analysis of PWR and SMR Systems

The development of a new PWR or small modular reactor (SMR) design relies on reliable analysis tools to assess feasibility and determine parameters essential for design optimization. Advanced modeling and simulation play a crucial role in this process. The CUPID code is used to explore new PWR or SMR designs currently being developed in Korea, with relevant physical models introduced and multi-scale, multi-physics analysis methods discussed in the context of SMR applications. Through hands-on study, students learn to analyze a small modular reactor conceptual design using CUPID.

N131 ▸ Nuclear Reactor Design and Safety

This course provides a comprehensive overview of nuclear power plant design and safety. Students first study the general principles of reactor design, followed by an introduction to the US NRC Design Certification (DC), the European Utility Requirement (EUR) review, and the Korea Regulatory Standard Design Approval (SDA) process. The course then focuses on regulatory requirements and key issues related to reactor safety as outlined in Chapters 15 and 19 of the APR1400 Safety Analysis Report (SAR). Finally, the curriculum covers practical aspects of reactor operation, including human factor engineering (HFE).

N132 ▸ Reactor Operations and Safety Analysis

This course is designed to provide a fundamental understanding of emergency operations for APR plants. It provides a comprehensive understanding of the relationships among Deterministic Safety Analysis (DSA), Probabilistic Safety Assessment (PSA), and actual accident responses in the simulator for six major accidents, including Loss of Coolant Accidents (LOCA) and Excess Steam Demand Events (ESDE).

N222 ▸ Radioactive Waste Management

This course provides essential knowledge and practice in implementing safe and cost-effective management of low- and intermediate-level radioactive wastes from the operation of nuclear power plants and industrial applications. Two different types of repositories are studied: the trench and rock cavern types. The course covers trans-scientific subjects bridging social and natural sciences, including Public and Stakeholder Engagement (PSE), and technical approaches to assuring the long-term post-closure radiological safety of the proposed repositories.

N223 ▸ Safety, Security, and Safeguards on Nuclear Fuel Cycles

This course provides essential knowledge and practice in implementing safety, security, and safeguardability across the entire nuclear fuel cycle. For safety, the detailed Total System Performance Assessment approach is studied, from FEP analysis to intuitive safety analysis for long-term post-closure radiological safety, using assessment method flowchart approaches. The fundamentals of deep geologic disposal and key alternative ideas are discussed. Security covers the fundamentals of human-induced events such as terrorist attacks and drone applications. Safeguards address the implication of significant quantities across nuclear fuel cycle facilities.

N202 ▸ Nuclear Materials

This course provides an in-depth study of the properties and in-core performance of key reactor materials, including nuclear fuel and core structural materials, through the principles of thermodynamics and materials engineering. Students develop a comprehensive understanding of the thermal and mechanical behavior of reactor materials under operating conditions, along with the impact of neutron irradiation, such as material damage and its consequences. The course also includes hands-on experience with the Monte Carlo simulation code, TRIM, enabling students to evaluate the interactions of energetic particles with target materials.

N203 ▸ Nuclear Fuel Cycle

This course covers the front-end and back-end stages of the nuclear fuel cycle, with a focus on spent fuel management options including reprocessing, recycling, storage, and direct disposal. Students gain a thorough understanding of fuel cycle technologies while developing insights into the economic, social, and policy considerations associated with spent fuel management.

N221 ▸ Radiation Shielding Analysis

This course covers fundamental knowledge of radiation, radiation exposure, health effects of radiation, concepts of radiological protection, and radiation shielding analysis for radiation and nuclear facilities. In addition, the course is designed to allow students to directly perform demonstrations and hands-on practice using radiation shielding simulation codes.

N224 ▸ Environmental Impact Assessment

This course covers radiological risk assessment and environmental analysis, including the full scope of source-term, atmospheric dispersion, exposure pathway, and dose assessment during normal operation, design basis accidents, and severe accidents. The course also covers radiological and nuclear emergency planning and response (EPR). Students understand safety fundamentals, requirements, and guides in radiological environmental impact assessment (R-EIA) and practice R-EIA using a PC simulator of the APR1400. Relevant computer code is demonstrated using the emergency response code (RASCAL) developed by the US NRC.

N301 ▸ Contract and Claim Management

This course provides an in-depth analysis of contract structures and practical applications of international standard forms—FIDIC, NEC, and EJCDC—within the context of overseas nuclear power plants and large-scale infrastructure projects. The curriculum focuses on the rigorous safety regulations and complex risk-sharing mechanisms unique to nuclear projects, teaching strategic approaches to securing contractual entitlements. Through hands-on workshops using real-world-inspired claim scenarios, students master the skills of issuing notices, proving causation, and navigating dispute resolution. The course also explores U.S. standard forms, focusing on EJCDC and ConsensusDocs, to understand the distinct management characteristics of Common Law-based projects.

N304 ▸ NPP Project Development and Contract

This course explains how to plan, develop, evaluate, fund, and contract NPP international projects. Lectures cover not only NPP projects but also various international mega-projects. Considering factors such as financing, resources, experience, national industry, and project risk, owners select the best delivery methods among DBB, EPC turnkey, DBF, BOO, and others. Contractors prepare bids and proposals considering marketing, construction, operation, and financial risk. The course particularly addresses NPP project risks and how to manage them through contract approaches, providing valuable insight for those interested in exporting or importing nuclear power plants.

N303 ▸ Advanced Topics for Nuclear Project Management

This course addresses cutting-edge management issues in NPP project management. Based on the registered students' interests, the course selects a few topics from risk management, advanced work packages, BIM, configuration management, SMR construction, deep geological repositories, generative AI, and others. Students then investigate and analyze the detailed contents of the selected topics.

N314 ▸ Special Issues in NPP Natural Hazards Analysis

This second-year project course is intended to help students understand and apply the tools and techniques used in first-year courses to conduct seismic hazard analyses for a nuclear power plant project. Students undergo the basic life cycle of probabilistic seismic hazard analysis by characterizing regional seismicity, selecting ground motion models, constructing hazard curves, and deriving the relevant ground motion parameters such as response spectra curves.

N312 ▸ NPP Site Hazard Analysis and Evaluation

This course presents several modern analysis techniques and processes used in evaluating the impact of natural hazards on nuclear power plant site evaluation and selection activities. The natural hazards considered include meteorological, flood, and earthquake hazards—hazards that are important not only in site evaluation and selection but also in design documents, construction, safety analysis, and review. In addition to various statistical techniques, special review processes are also introduced.

N323 ▸ NPP Financial Management

The purpose of this course is to provide an overview and basic foundation in nuclear finance and its application on top of general finance theories and decision-making tools. Students are expected to acquire Excel techniques to perform basic financial analysis. The course covers topics including capital budgeting, risk and return, LCOE estimation, and basic project valuation. Engineers without a background in finance are recommended to take this course to advance toward middle-level management roles.

N313 ▸ NPP Project Deployment

This course presents a variety of concerns and activities required for implementing a national civil nuclear energy program. It introduces the IAEA milestones approach in developing nineteen infrastructure issues (IAEA NG-G-3.1) covering nuclear safety, management, funding and financing, legal framework, safeguards, regulatory framework, radiation protection, electrical grid, human resource development, stakeholder involvement, environmental protection, emergency planning, nuclear security, nuclear fuel cycle, radioactive waste management, and procurement, with tie-ins to environmental impact assessment reporting and US NRC NUREG 0800-style safety reports. Coverage focuses on phases related to milestones 1 (pre-project activities) and 2 (project development).

N302 ▸ NPP Construction Project Management

This course improves knowledge of controlling schedule, cost, and quality in international construction projects. The lectures cover not only NPP projects but also international mega-projects. The class focuses on delivering key fundamentals and practical skills through actual cases and software practice. The course provides methods to successfully manage and complete international construction projects from both owner and contractor perspectives. This course does not deal with technical issues and operation skills.

N322 ▸ Energy Business Environment

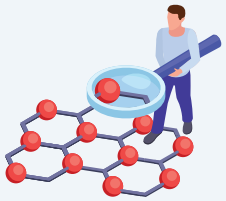
The course topics relate to understanding and managing aspects of the energy business environment, including energy market, political, legal, regulatory, business, and societal environmental subjects. Through demonstration of energy planning tools, students gain the capacity to establish and analyze a country's energy plan. The course is helpful for gaining effective insight and practical knowledge on the energy environment for future leaders. A project on construction delay and cost overrun focusing on environmental effects is also implemented through group study.

C801 ▸ Introduction to Data Analysis and Machine Learning

This course serves as an introduction to programming with Python, statistics, and their applications. Statistics are mathematical tools that can describe and summarize information and processes. Topics include principles of measurement, measures of central tendency and variability, probability distributions, correlation, and regression. Students simultaneously learn programming in Python to perform select statistical analyses. Near the end of the course, an introduction to artificial intelligence and machine learning is presented.

C802 ▸ Data Analysis and Application

This course introduces students to the fundamental and advanced concepts of Artificial Intelligence (AI) in the context of power system operation. It focuses on applying AI methodologies, such as machine learning and artificial neural networks, to optimize power grid operations and improve the efficiency of energy management systems. Students explore neural network structures, gradient descent methods, and data processing techniques that are pivotal for load forecasting and decision-making within the power sector. Practical MATLAB exercises enable hands-on experience in implementing and validating AI models, fostering skills crucial for real-world power systems and nuclear energy applications.



N151 ▸ NPP O&M Management

All members engaged in the nuclear power industry share collective responsibility and accountability for nuclear power plant performance. The common goal—Operational Excellence in Safety and Reliability—is strongly influenced by the quality of plant operation and maintenance performance (NPP O&M). This course is designed for current and prospective professionals working in the nuclear industry, enabling them to acquire a broad foundation of essential O&M fundamentals. The overarching aim is to support learners in systematically building the capabilities required to grow into competent leaders across diverse sectors of the nuclear industry.

N152 ▸ NPP Management and Leadership Traits

This course provides valuable learning opportunities for employees of nuclear power plant operating companies and professionals from other sectors of the nuclear industry. The first half focuses on strengthening foundational competencies required for management roles—core skills that technical personnel in the nuclear sector must possess. The latter half emphasizes the development of leadership capabilities within organizational settings. The curriculum incorporates the four educational pillars of the IAEA's INMA and various industry standards issued by U.S. regulatory authorities, including responses to emerging technologies such as AI and cybersecurity.

C803 ▸ NPT, Verification & Peaceful Nuclear Uses

This course is the continuation of "NPT, Disarmament and Non-Proliferation" from the first semester. Students study further non-proliferation, focusing on safeguards and verification, including inspection and sanction regimes. The course also examines current mechanisms for promoting peaceful uses of nuclear energy, including legal frameworks for peaceful nuclear cooperation, particularly inter-governmental agreements (IGAs), and the function and responsibility of the IAEA. Students learn about the contribution of nuclear power plants toward Carbon Neutrality 2050 and the implementation of the 17 UN SDGs, and the implications of emerging technologies such as cyber and AI in peaceful uses of nuclear energy.

Department of Energy Policy and Engineering

Course Description

Curriculum & Study Areas

Energy Policy and Management Track

The Energy Policy and Engineering Track offers a comprehensive curriculum designed to provide students with an in-depth understanding of the technical, economic, and policy dimensions of the energy sector. This program integrates foundational knowledge with advanced analytical skills, preparing students for various roles in energy management, policy-making, and technical operations.

Study Areas

Net-Zero Microgrid and Small Modular Reactor, Financial Management, Environment Policy and Utility Management, Net-Zero Technology and Project Development, Project Valuation and Risk Management, Grid Planning and Power System Development

Compulsory Courses*

- **Electric Resource Planning and Optimization**
- **Electric Power System Economics**
- **Electricity Market Design and Operation**
- **Project Valuation and Risk Analysis**
- **Leadership and Communication, Technical Writing, Speech and Debate, Cross Cultural Program**
- **Thesis and Individual Project Report**

Elective Courses*

- **Power System Basics and Grid Planning**
- **Corporate Finance and Accounting**
- **Introduction to Data Analysis and Machine Learning**
- **Environmental Policy and Utility Management**
- **Net-Zero Microgrid and Small Modular Reactor**
- **Net-Zero Technology and Grid Transformation**
- **Data Analysis and Application**

* The Compulsory Courses and Elective Courses are based on the 2026 academic year curriculum and are subject to change.

Common Compulsory Courses

E022 ▸ Electric Resource Planning and Optimization
This course focuses on resource planning and optimization with a nuclear-centered perspective, using internationally recognized planning models: MESSAGE and WASP. The course emphasizes the role of nuclear power in long-term energy policy analysis and medium-term generation expansion planning. Students learn how nuclear power is represented in energy system models, how policy and technology assumptions affect system outcomes, and how modeling results can support national energy strategies, particularly for nuclear newcomer and expanding countries.

E021 ▸ Electric Power System Economics
This course explores the investment and operation of power systems since the introduction of competition in the power supply industry. The instructor comprehensively reviews fundamental concepts in microeconomics, electricity market organization and operation, operational reliability, ancillary services, network congestion, transmission investments, and generation investments. Practical insights from broad in-field experience help students develop innovative solutions to power system problems that vary by country, market, and company.

E023 ▸ Electricity Market Design and Operation
This course explores the dynamic evolution of electricity markets in practical contexts and the interplay among policy makers, regulators, and stakeholders. It examines how market designs change and adapt to evolving conditions, including regulatory schemes, market design issues, operational processes, and risk management. Hands-on practices for experimental market design and practical field insights help students understand electricity market design and operation, as well as investment and risk management in competitive market environments.

E024 ▸ Project Valuation and Risk Analysis
This course provides the financial tools needed to make sound energy investment decisions by linking corporate finance knowledge to project valuation and risk analysis. Using DCF valuation, students learn how energy investors interpret valuation results, improve project value, and create the financial flexibility needed to implement investment strategies. The valuation model is expanded to Monte Carlo simulation so students can practice quantitative risk analysis.

C003 ▸ Leadership and Communication I, C004 ▸ Leadership and Communication II
Rooted in the Leadership and Negotiation Program of the Harvard Business School and Harvard Law School Program on Negotiation, this course series trains current and future leaders of energy or nuclear/radiological organizations to become adept at internal and external communication. Learners develop a way to understand themselves and others better and become familiar with a "principled negotiation" model to prepare for, execute, and meaningfully reflect on discussion, negotiation, and conflict resolution opportunities. The course is heavily interactive, requiring regular preparation prior to class, active participation, and reflection assignments. Leadership and Communication II builds on these skills through more complex cases and individualized coaching.

C007 ▸ Technical Writing I, C008 ▸ Technical Writing II, C009 ▸ Advanced Technical Writing
This course provides a weekly class consisting of a lecture on understanding the structure and organization of an academic paper in technical English, and a hands-on session in which students draft a conference paper. Students develop key skills required for academic writing such as clarity, coherence, avoiding plagiarism, and adhering to academic conventions and ethics. Students select a research topic, conduct literature searches, and submit weekly drafts according to schedule, receiving detailed feedback and revising accordingly. By the end of the semester, students will have completed and finalized one conference paper.

C011 ▸ Speech and Debate
This course is designed to enhance students' soft skills and confidence in public speaking, group discussions, oral presentation, written communication, and critical and analytical thinking through the use of debating skills to analyze social, political, and economic issues. Students actively engage in discussions and formal debates on key issues that affect businesses and the global community. After learning the basics of speech and debating fundamentals such as argumentation, refutation, case construction, and verbal and non-verbal presentation techniques, students produce a video recording of their own presentation as a term project.

C001 ▸ Cross Cultural Program I, C002 ▸ Cross Cultural Program II
This program consists of three sub-courses. Cultural Korean aims to help international students gain the basics of spoken and written Korean while focusing on the development of communicative language skills. Cross Culture aims to develop a stronger cultural understanding between Korean and international students by helping them understand cultural diversities, respect differences in culture, and boost communication skills and cultural exchanges. Culture Trip takes place at the end of each semester and aims to promote cultural and social exchange between Korean and international students.

C027, C028 ▸ Thesis and Individual Project Report
This research course guides master's degree students in developing either a thesis (MS) or an individual project report (ME) under the supervision of their advisors. Students define a topic, prepare a proposal, conduct a literature review, and apply appropriate methods to produce a scholarly work. Regular meetings, progress submissions, and feedback support iterative refinement from plan to final draft. Completion requires an advisor-approved final thesis/project report and presentation, as applicable.

Elective Courses

E111 ▸ Power System Basics and Grid Planning

This course explores the intricacies of the power system, examining it from both technical and economic perspectives. The instructor addresses critical topics such as load flow calculation, fault current calculation, and stability techniques, which are indispensable for power system design and operation. Special emphasis is placed on real-world cases related to transmission network development. Students acquire a profound understanding of power system planning and operational theory, essential for adept management of power systems.

E101 ▸ Corporate Finance and Accounting

This course provides an overview and solid foundation in energy finance and accounting, combining general finance theory with practical decision-making tools. Students acquire Excel techniques for basic financial analysis and study capital budgeting under uncertainty, risk and return, capital structure, and power project valuation. The course also introduces basic regression analysis methods for data forecasting, preparing Energy Policy and Engineering students for second-semester compulsory courses.

C801 ▸ Introduction to Data Analysis and Machine Learning

This course introduces programming with Python, statistics, and their applications. Statistics are mathematical tools used to describe and summarize information and processes. Topics include measurement principles, measures of central tendency and variability, probability distributions, correlation, and regression. Students simultaneously learn Python programming to perform selected statistical analyses. Near the end of the course, an introduction to artificial intelligence and machine learning is presented.

E121 ▸ Environmental Policy and Utility Management

This course explores the integration of environmental policy and resource allocation challenges. It addresses three core issues: resource scarcity, environmental externalities, and energy transition. The curriculum progresses through microeconomic theory, market failure analysis, and policy tools such as benefit-cost analysis, environmental valuation, and dynamic efficiency. Students develop competencies in diagnosing market failures, designing policy instruments, and evaluating efficiency and feasibility, cultivating rigorous economic analysis skills for environmental policy and public energy utility management.

E123 ▸ Net-Zero Microgrid and Small Modular Reactor

This course focuses on optimal integration and economic operation of generation resources and energy storage systems, including renewable energy, batteries, and SMRs. It highlights growing battery storage deployment driven by declining costs and expected SMR use in microgrids as the technology matures and becomes more cost-competitive. Students learn microgrid components and analyze optimal design from an economic perspective and operational performance from a technical perspective using software-based simulation tools such as HOMER.

E112 ▸ Net-Zero Technology and Grid Transformation

This course explores diverse net-zero technologies, including renewable resources, energy usage, and SMRs, along with evolving requirements for integrating them into power grids. It examines technical prerequisites from the perspectives of grid operators and renewable energy developers while providing practical insights from broad field experience. Students acquire qualitative and quantitative frameworks for evaluating and analyzing energy technology systems and evolving power grids in engineering and economic contexts.

C802 ▸ Data Analysis and Application

This course introduces fundamental and advanced concepts of Artificial Intelligence (AI) in power system operation. It applies AI methodologies, including machine learning and artificial neural networks, to optimize power grid operations and improve energy management systems. Students explore neural network structures, gradient descent methods, and data processing techniques for load forecasting and decision-making in the power sector. Practical MATLAB exercises build hands-on skills for implementing and validating AI models in real-world power systems and nuclear energy applications.

C803 ▸ NPT, Verification & Peaceful Nuclear Uses

This course deals with the study of safeguards, verification, inspections, sanctions, and peaceful nuclear cooperation. It covers inter-governmental agreements, the role of the IAEA, nuclear energy's contribution to Carbon Neutrality 2050 and the UN Sustainable Development Goals, and emerging issues such as cyber and AI in peaceful nuclear uses. Recent NPT-related news articles and journal materials are discussed in class.

Educational Facilities:
Department of Nuclear Power Plant Engineering

APR1400 NPA (Nuclear Plant Analyzer)

The Nuclear Plant Analyzer (NPA) performs real-time and high-speed simulations of APR1400 to represent scenarios in the main control room, which is designed to be identical to that of an actual nuclear power plant. Through the training, the students will gain a better understanding of the safety and key auxiliary systems of NPPs, enhance their safety analysis capabilities, and improve their ability to respond to emergencies. The NPA provides detailed representations of thermal-hydraulics and core behaviors in NPPs during various operational transients and accident conditions.

VR (Virtual Reality) Classroom

In collaboration with KHNP, our VR Classroom provides students with immersive experiences in the construction, operation, and maintenance of nuclear power plants developed by KHNP. Through virtual reality, students can engage in activities such as disassembling and assembling major components, as well as conducting walkdowns, offering a hands-on experience inside a nuclear power plant. These simulations move beyond traditional textbook learning, enabling students to develop a comprehensive understanding of NPP structures. Moreover, VR allows students to explore inaccessible areas within NPPs, providing valuable insights into otherwise restricted environments.

High-Performance Cluster Server

KINGS operates a high-performance cluster system. This system provides a professional and structured educational environment by supporting high-reliability nuclear core and safety analysis code systems applicable to commercial settings.

The cluster server is utilized for the following purposes:

- Core analysis code development and small modular reactor (SMR) core design training
- Programming practice using characteristic curve methods and Monte Carlo techniques
- Computational support for students working on numerical analysis software


THE NEXT DECADE:
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For more information, visit the KINGS website(**www.kings.ac.kr**) or
contact Admission and Student Affairs Team at **admission@kings.ac.kr**

2027 ADMISSION GUIDELINES

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