Graduate School of Ocean Systems Engineering	Web Site : http://me.kaist.ac.kr/kr/
	Office Phone : +82-42-350-3002~5

☐ Introduction

The Graduate School of Ocean Systems Engineering at KAIST was established in 2008 within the School of Mechanical Engineering. Its pillar charters are to educate young talents and conduct research so that its graduates will play leading roles in the new burgeoning frontiers of ocean systems as well as in Korean shipbuilding and offshore industry. The school's status was further bolstered in November 2008 by winning the World Class University Project funded by Korean Science Foundation that will facilitate KAIST OSE to become a leading ocean systems engineering department in the world.

Ocean systems would be large in spatial dimension and require complex construction and operation procedures. In order to develop a good ocean system, several core technologies have to be integrated such as shipbuilding, ocean engineering, mechanical engineering, electrical and electronic engineering, civil engineering, industrial engineering, petro chemical engineering, technology management, computer science, telecommunications, and perhaps a new field heretofore not identified. Hence, interdisciplinary synergism and collaboration is essential.

To complement the young department, KAIST OSE plans to collaborate with and seek support from Korea's shipbuilding industry and also from the national research laboratories in Daedeok Science town such as MOERI (marine and ocean engineering research institute, www.moeri.re.kr), KIMM (Korea institute of machinery and materials, www.kimm.re.kr), KR (Korea Register of Shipping, www.krs.co.kr), Korean Navy (www.navy.or.kr), ADD (Agency for Defense Development, www.add.re.kr), HHI (Hyundai Heavy Industries, www.hhi.co.kr), SHI (Samsung Heavy Industries, www.shi.samsung.co.kr), DSME (Daewoo Shipbuilding & Marine Engineering, www.dsme.co.kr), STX (STX Offshore & Shipbuilding, www.stxons.com), and HHIC (Hanjin Heavy Industries and Construction, www.hanjinsc.com)

Postgraduate-level students can select their own course work under the supervision of mentoring faculty members, instead of following pre-defined courseware. The analytical approaches provided by the core courses will help them solve the large and complex problems of ocean systems. Furthermore, hands-on experience gained through work in laboratories and international industry internships will motivate them to recognize world-class requirements and to challenge critical real-world problems.

To foster interdisciplinary education experience, the OSE graduate students will scope out their individualized courses offered not only in the School of Mechanical Engineering but also across the institute with consultations with mentoring faculty members. Hands-on experience through laboratory work and industry internship will help students

to grasp the real world requirements and problems.

▣ Research of KAIST Mechanical Engineering

1) Port and Coastal Engineering

- Computer-aided Port Design
- Research of Earthquake and Tsunami
- Research of moving Floater/Sediment within the port
- Coast/Marine Structure design (Quavy wall, Break water, Jetty, Dolphin, LNG terminal, Anchoring)
- Floater Structure Analysis and Design
- Port Environmental Engineering
- Port Design

2) Offshore Plant Engineering

- Subsea production plants
- LNG FPSOs
- LNG fuel gas supply system for large carriers
- LNG bunkering shuttles and bunkering terminals
- CO2 Carriers and offshore injection facilities
- Risk-based design and system safety design
- Fire and explosion risk analysis
- System reliability engineering
- Life-cycle economic analysis

3) Underwater Technology

- Underwater acoustics, underwater localization
- Marine structural response analysis to underwater explosions
- Naval and anti-submarine warfare technologies
- Guidance, navigation and control of underwater vehicles
- Underwater Robotics: Autonomous Underwater Vehicles(AUVs), Remotely Operated Vehicles(ROVs)
- Biomimetic Underwater Robots, artificial muscles, grapheme-based sensors and actuators

4) Ocean Systems Modeling and Simulation

- M&S (Modeling and Simulation) of Underwater Explosion
- M&S of Ocean Synthetic Environment
- RFID (Radio Frequency Identification), CAD/CAM, Product Lifecycle Management
- Virtual reality and operator training system
- Finite element modeling of floating structures and fluid-structure interaction
- Continuum mechanics for large deformation, strain and inelastic behavior

5) Ocean Systems Management

- Shipping & logistics
- Ship production systems engineering
- Accuracy control, tolerance analysis and synthesis
- Tolerance optimization for compliant metal plate assemblies consider-

ing welding distortions
- Simulation-based tools to support decision making in ship design/production system

6) Ocean Environment and Renewable Energy

- Seawater desalination: Reverse-Osmosis Layer-by-Layer Composite Nano-Filtration Membrane
- Fluid Mechanics & Aquaculture: Mid/Large-scale fluid mechanics related to the habitation and migration of living organisms in the ocean
- Wave Mechanics: Surface Waves, Internal Waves
- Fluid-Body (Rigid, Elastic) Interaction
- Offshore wind power system: Fixed-type and Floating-type
- Wave power system: Wave focusing system
- Current power system: Self-excited oscillation type
- Ocean nuclear power system: Gravity-based structures
- Ocean Observation : Coastal Ocean Observation System (COOS)